UNITED STATES DISTRICT COURT
WESTERN DISTRICT OF NEW YORK

SAMUEL M. ROBERTS,

Plaintiff,

vs.

LOS ALAMOS NATIONAL SECURITY, LLC, AWE, PLC., MASSACHUSETTS INSTITUTE OF TECHNOLOGY,

Defendants,
Third-Party Plaintiffs,

vs.

UNIVERSITY OF ROCHESTER

Third-Party Defendant.

AFFIDAVIT IN OPPOSITION TO PLAINTIFF'S MOTION TO STRIKE DEFENDANT/THIRD-PARTY PLAINTIFF LOS ALAMOS' ANSWER

Civil No. 11 CV 6206L

STATE OF NEW YORK)
COUNTY OF MONROE) ss:

Greta K. Kolcon, Esq., being duly sworn, deposes and states:

1. I am an attorney admitted to practice before the United States District Court for the Western District of New York and a partner in the law firm of Woods Oviatt Gilman, LLP, attorneys for Defendant/Third-Party Plaintiff Los Alamos National Security, LLC, ("LANL") and I make this Affidavit based upon my personal knowledge and investigation in opposition to Plaintiff's motion pursuant to Federal Rule of Civil Procedure 37 requesting the Court to issue the most extreme sanctions available to the Court, including the issuance of an Order to strike the Answer of the Defendant, Los Alamos National Security, LLC, granting Plaintiff judgment by default, and holding Los Alamos National Security in contempt of Court for allegedly willfully failing to comply with an Order of this Court.

2. This Affidavit is based on my personal knowledge and investigation of the progression of the litigation of this case, and is submitted on the grounds that the relief requested by Plaintiff's application would be wholly inappropriate in light of the evidence that LANL has fully complied with all directives of this Court in a timely manner and has participated in discovery in good faith. Further, Plaintiff has suffered no prejudice and the current deadline for fact discovery is not until February 28, 2013.

3. For ease of reference, the following table sets forth the Exhibits annexed to this Affidavit:

EXHIBIT	DESCRIPTION	DATE
Exhibit A	Plaintiff's First Demand For Discovery and Inspection	02/07/12
Exhibit B	Defendant/Third-Party Plaintiff Los Alamos National Security, LLC's Response to Plaintiff's First Demand for Discovery and Inspection	02/24/12
Exhibit C	Los Alamos' Rule 26 Disclosure Documents	03/07/12
Exhibit D	Defendant/Third-Party Plaintiff Los Alamos National Security, LLC's Supplemental Response to Plaintiff's First Demand for Discovery and Inspection	05/04/12
Exhibit E	Defendant/Third-Party Plaintiff Los Alamos National Security, LLC's Second Supplemental Response to Plaintiff's Demand for Discovery	10/05/12
Exhibit F	Defendant/Third-Party Plaintiff Los Alamos National Security, LLC's Third Supplemental Response to Plaintiff's Demand for Discovery	10/31/12
Exhibit G	Letter from Los Alamos' Counsel requesting the Court for a judicial pretrial conference	10/10/12
Exhibit H	Possible Search Terms	10/22/12

I. LANL HAS FULLY COMPLIED WITH THE COURT'S DISCOVERY ORDER AND PLAINTIFF HAS FAILED TO DEMONSTRATE ANY BASIS FOR THE REQUESTED SANCTIONS

4. The subject of this motion is the Court's Order filed on August 8, 2012, Docket Number ("Dkt. No.") 53. Plaintiff's counsel argues that LANL should be sanctioned based upon two separate discovery issues: A) LANL's response to Plaintiff's Amended Request for Admission 9; and B) LANL's response to Plaintiff's Notice for Discovery and Inspection 1 and 2. However, LANL has not violated a single decretal directive of the Order.

A. LANL PROVIDED TIMELY AND PROPER RESPONSES TO PLAINTIFF'S AMENDED REQUESTS FOR ADMISSION

5. Plaintiff's counsel is dissatisfied with the content of the responses served by LANL in its Responses to Plaintiff's Amended Rule 36 Requests for Admission, and more specifically, Request No. 9. However, LANL'S Responses to the Amended Requests for Admission were not the subject of a prior motion to compel discovery, and there is no prior Court Order relating to Request No. 9 that could serve as the basis for a motion for contempt of court.

6. The Court's Order (Dkt. 53) directs LANL to provide an additional response to Plaintiff's Requests for Admission Nos. 1-6. On the pending motion to compel, Plaintiff has not claimed that LANL failed in any way to comply with this directive of the Order.

7. The Order next requires Plaintiff to serve Amended Requests for Admission and then states "Upon receipt of the Amended Requests, the Defendant shall thereafter admit or deny the Amended Requests." (Dkt. 53)

8. It is undisputed that LANL received Plaintiff's Amended Requests for Admission numbered 7 through 18, and that, pursuant to Rule 36, LANL served a timely response admitting or denying each of the amended requests on September 5, 2012. *See*, Declaration of Louis J. Micca, dated October 9, 2012 ("Micca Decl."), Ex. B (Dkt. 65-3).

9. Whether Plaintiff's counsel finds LANL's substantive response in accord with his client's claims is not a basis for filing a motion for sanctions, and Plaintiff's motion should be denied.

B. LANL COMPLIED WITH THE COURT'S ORDER REGARDING DOCUMENT DISCOVERY

10. The Court's Order granted Plaintiff's discovery motion, and directed counsel for LANL to file an affidavit of a Los Alamos employee with direct knowledge of its document and email retention system stating five items and to have the affidavit filed within thirty days of the Order. (Dkt. 53).

11. Each of the substantive items were carefully reviewed and Los Alamos employees with direct knowledge of each of the subject areas were identified. Each employee provided the requested information, and each employee executed an affidavit directly responsive to each of the decretal items. Attorney Christine Chandler, Senior Counsel for LANL, addressed the litigation hold, preservation, and collection of information. Christopher C'de Baca, Acting Group Leader of the Records Management Service Group, addressed the records retention policies. Stephanie T. Lovato, Computing Systems Tec 4, addressed computer data, backup systems, and scope of accessible data. Each of those affidavits was timely filed with the Court pursuant to the Order. See Dkt. 59, 59-1 and 59-2.

12. Prior to filing this current motion for contempt, Plaintiff's counsel has argued that Los Alamos was required to file an affidavit stating whether LANL had conducted any search of the data. *See*, Dkt. 65-4 (correspondence from Louis Micca, Esq. dated September 27, 2012). However, the Order did not require this statement from LANL employees; rather, LANL was to provide a statement about its litigation and efforts. As the filed affidavits of Lovato and Chandler reflect, these issues are sufficiently addressed (Dkt. 59-2), and Plaintiff's motion should be denied.

II. LANL HAS PROVIDED DOCUMENT DISCOVERY IN GOOD FAITH

13. There are two discovery requests that are the focus of discovery disputes in this case. Plaintiff's First Demand for Discovery and Inspection, attached as ***Exhibit A*** hereto, Demands #1 and #2 are the specific requests that Plaintiff is alleging that LANL is failing to respond to, in alleged violation of this Court's discovery Order.

14. As set forth in the prior filed Affidavit of Attorney Christine Chandler (Dkt. 59), upon notice of this lawsuit, LANL took prompt steps to initiate a litigation hold and to preserve and collect information that may be related to the claims in this case.

15. Plaintiff's First Demand for Discovery and Inspection was served on February 7, 2012. On February 24, 2012, LANL's served its initial responses to Plaintiff's First Demand for Discovery and Inspection, primarily to set forth and preserve objections. On March 7, 2012, LANL provided its Rule 26 Disclosure, including a number of documents. A copy of Los Alamos' Rule 26 Disclosure is attached as ***Exhibit C***.

16. In fact, the scope of Plaintiff's original disclosure requests was extremely limited, and Plaintiff has not served additional discovery demands that would expand the scope of the requests.

17. LANL's counsel continued its efforts to review available documentation for responsiveness, and on May 4, 2012, LANL served its Supplemental Response to Plaintiff's First Demand for Discovery and Inspection, attached hereto as ***Exhibit D***.

18. Despite Plaintiff's counsel's refusal to participate in any discussions regarding search terms for purposes of supplemental electronic discovery, LANL has continued its efforts to locate potentially responsive material, although much of the material that has been reviewed does not appear at all relevant to Plaintiff's request.

19. On October 5, 2012, LANL served its Second Supplemental Response to Plaintiff's Demand for Discovery, attached hereto as ***Exhibit E***, and on October 31, 2012 LANL served its Third Supplemental Response to Plaintiff's Demand for Discovery, attached hereto as ***Exhibit F***.

20. Plaintiff's counsel's primary argument that LANL is withholding documents is based on his perception that other parties have produced documentation that was not produced by LANL. On this motion, Plaintiff's counsel's points to documentation submitted by the University of Rochester in response to Plaintiff's demands to the University of Rochester, attached to Mr. Micca's Affidavit as Exhibit F. Dkt. 65-7. However, upon review of that material, the vast majority of those documents have nothing to do with LANL's experiments being conducted at the LLE on the date of the accident, or the cause of the Plaintiff's accident, which is the subject of Plaintiff's requests issued to LANL. As set forth in the accompanying Affidavit of Dr. Hans Herrmann, sworn to on November 14, 2012, Dr. Herrmann details the content of the University of Rochester's disclosures. In fact, of the 124 pages that Mr. Micca submitted, two of the emails that do appear to be relevant to events on August 6, 2008 were previously produced by LANL in the Supplemental Disclosures prior to the time this motion was filed, which leaves only three discrete pages of materials that were not produced by LANL that are even arguably relevant to this case out of those 124 pages. Those pages are Dkt. 65-7 page 33, 93, and 94. Page 93 and 94 appear to be attachments to an email that was produced by LANL, and LANL is continuing its discovery efforts to attempt to locate a similar document in its electronic data. However, since Plaintiff is already in possession of the document, Plaintiff cannot argue that there is any prejudice.

21. Plaintiff has not claimed any prejudice, nor has Plaintiff suffered any actual prejudice in the discovery process with LANL.

22. As a practical matter, the production by other parties of material that is not relevant or responsive to the Plaintiff's requests to LANL does not establish any willful violation of good faith discovery by LANL.

III. LANL'S GOOD FAITH EFFORTS TO RESOLVE DISCOVERY DISPUTES

23. As set forth in the accompanying Affidavit of Attorney Beryl Nusbaum, sworn to on November 17, 2012, counsel for LANL has attempted to engage Plaintiff in meaningful discussions on the scope of supplemental discovery, and Plaintiff's counsel refused to participate or cooperate. In connection with electronic discovery, LANL has even offered to conduct any requested electronic searches at no cost to Plaintiff or Plaintiff's counsel.

24. Following Plaintiff's filing of the motion for contempt, I requested a judicial pretrial conference with the goal of attempting to resolve any outstanding discovery or Plaintiff's dissatisfaction with the discovery production on behalf of LANL. A copy of my correspondence to Magistrate Jonathan W. Feldman, dated October 10, 2012, is attached as ***Exhibit G***. As that letter sets forth, I advised the Court that Los Alamos has technical ability to conduct various types of searches for electronic data and indicated that Los Alamos was not resisting any discovery production, including the offer of further discovery searches at no cost to Plaintiff.

25. A judicial pretrial conference was conducted in response to my request, and at that conference, I presented the Court and Plaintiff with a list of possible electronic search terms to try to engage a resolution process in good faith. A copy of that document is attached as ***Exhibit H***. Plaintiff's counsel took the position at that conference that it was not necessary for him to identify any potential search terms to electronically search Los Alamos' data.

26. I advised the Court that Plaintiff could review whatever scope of documents he would like to review so long as they have been screened for objections on the basis of privilege.

Plaintiff's counsel continued to indicate that he wants "everything." At the same time, during the conference, Magistrate Judge Feldman indicated that defense counsel was required to review all of the materials for relevance rather than providing substantial quantities of irrelevant material to the Plaintiff.

27. The difficulty remains that LANL is not refusing to produce any documentation that appear to be responsive to Plaintiff's limited discovery requests, and Plaintiff has been provided numerous opportunities to make further or different discovery requests and to engage cooperatively in a search for electronic discovery, all of which Plaintiff has declined to do. Still, Plaintiff's counsel continues to insist that there must be documents that are relevant that are being withheld.

28. Following the conference, I have continued to work with LANL to explore utilizing various electronic discovery searches with an outside vendor on material. At this point, thousands of documents have been reviewed through this electronic process, and the vast majority of the documents that have been reviewed have nothing to do with the facts of this case, the cause of the Plaintiff's accident, or the experiments being conducted on the date at issue. A number of duplicates have been identified of documents that have already been produced, but we are continuing to screen LANL's employees for potential custodians of responsive materials, and to supplement disclosure.

29. LANL has continued to search for materials which could be even tangentially related to Plaintiff's discovery requests, and will continue to produce supplemental discovery as further documents are identified in a good faith effort to satisfy Plaintiff's requests and the Court's discovery Order.

IV. A DISCOVERY STAY IS APPROPRIATE AT THIS TIME

30. The current Scheduling Order in place (Dkt. 54), which was entered with agreement of all parties, provides that fact discovery shall be completed on or before February 28, 2013.

31. At this point, there has been no discussion between counsel regarding scheduling dates for deposition of any of the parties in this case.

32. In fact, since the Amended Scheduling Order was entered on August 20, 2012, a number of motions for summary judgment on threshold legal issues have been filed including the University of Rochester's motion for summary judgment (Dkt. 56); Plaintiff's motion for partial summary judgment (Dkt. 63); the motion for summary judgment filed on behalf of Los Alamos National Security, LLC (Dkt. 66); Massachusetts Institute of Technology's motion for summary judgment (Dkt. 61); and AWE PLC's motion for summary judgment (Dkt. 75). In addition, Los Alamos National Security, LLC has filed a motion to strike Plaintiff's statement of undisputed material facts (Dkt. 80). The briefing schedule for the various motions is not yet complete.

33. None of the parties have alleged that there is any outstanding discovery that would be required to be completed prior to determination of the motions that have already been filed.

34. Once determinations are complete on the pending motions, the scope of this case could dramatically change, including the potential for the entire matter to be dismissed if the relief requested on some of the various motions were to be granted by the Court.

35. However, as a result of the pending motions, LANL respectfully submits to the Court that a stay of discovery pending resolution of the dispositive motions now pending would be appropriate in this case to avoid unnecessary litigation and expense for the parties and for the Court.

36. Based on the foregoing, the undersigned respectfully submits the denial of all relief requested by Plaintiff on this motion is proper, and that the issuance of a stay of discovery pending resolution of the dispositive motions is also proper.

Greta K. Kolcon, Esq.

Sworn to before me this
19th day of November, 2012.

Notary Public

MONICA A. EAST
Notary Public, State of New York
Qualified in Monroe County
No. 01EA6073547
Commission Expires April 22, 2014

{1643835: }

EXHIBIT A

UNITED STATES DISTRICT COURT
WESTERN DISTRICT OF NEW YORK

SAMUEL M. ROBERTS,

Plaintiff,

-vs.-

Civil No. 11 CV 6206L

LOS ALAMOS NATIONAL SECURITY, LLC., AWE, PLC., MASSACHUSETTS INSTITUTE OF TECHNOLOGY,

Defendants,
Third-Party Plaintiffs,

-vs.-

UNIVERSITY OF ROCHESTER

Third-Party Defendant.

PLAINTIFFS' FIRST DEMAND FOR DISCOVERY AND INSPECTION

PLEASE TAKE NOTICE that, pursuant to Rule 34, Plaintiff, hereby demands that Defendants and the Third-Party Defendant provide the following documents for inspection and copying at the office of Plaintiff's counsel within thirty (30) days after service hereof:

Definitions

1. "Plaintiff" refers to Samuel M. Roberts.

2. "Defendants" refers to Los Alamos National Security LLC; AWE, Plc.; Massachusetts Institute of Technology; and University of Rochester.

3. "Person" means any individual, corporation, partnership, joint venture, firm, association, proprietorship, agency, board, authority, commission or other such entity.

4. "Affiliate" means any person in which the Defendants, or their subsidiaries have an ownership interest, legal or equitable.

5. "Subsidiary" means any person in which the Defendants own a majority interest over which you have control of corporate policy or decisions.

6. "Controlled group of corporations" shall have the meaning ascribed to such phrase by Section 1563 of the Internal Revenue Code, all of which is incorporated herein by reference.

7. "Predecessor" means any person through which you previously transacted business.

8. "Financial statements" includes but is not limited to the following, whether audited or unauditied, and whether final, interim, pro forma, complete or partial: consolidated and non-consolidated balance sheets, statements of earnings, additional paid-in-capital retain earnings or source and application of funds, cash flow projections, notes to each of such statements, and any other statements and notes which pertain to the applicable defendant's past or present financial condition including accountant's work papers.

9. "Communicate" or "communication" means every manner of disclosure, transfer, or exchange of information, whether orally or by document or whether face-to-face, telephone, by mail, personal delivery or otherwise.

10. "Document" means any original and any copy, including any copy that either is not identical to the original or that contains any notation or commentary that does not appear on the original, or any written, printed, typed, recorded, filmed or graphic material or sound recording, or transcript thereof, or data processing card, tape, disc or other data processing record, now or at any time in your possession, custody or control; and without limiting the generality of the foregoing definitions, but for purposes of illustration only, "document" includes booklets, brochures, pamphlets, circulars, notices, periodicals, papers, contracts, agreements, photographs, minutes, memoranda, messages, appraisals, analyses, reports, financial calculations and representations, invoices, accountings, diary entries, inventory sheets, calendars, ledgers, correspondence, telegrams, press releases, tabulations, projections, and all drafts thereof, surveys, graphs, charts, photographs, films, tapes, discs, drums, printouts, and financial statements.

a. Without limitation of the term "control" as used in the preceding

paragraph, a document is deemed to be in your control if you have the right to secure the document or a copy thereof from another person or public or private entity having actual possession thereof.

b. If a document is responsive to a request for identification or production and is in your control, but is not in your possession or custody, identify the person with possession or custody.

c. If a document was, but is no longer, in your possession or subject to your control, state what disposition was made of it, by whom, and the date or dates or approximate date or dates on which such disposition was made and why.

11. "Meeting" means any assembly, convocation, encounter, or contemporaneous presence of two or more persons for any purpose, whether or not planned, arranged or scheduled in advance.

12. "Policy" means any rule, procedure, directive, practice, or course of conduct, whether formal or informal, written or unwritten, recorded or unrecorded, which was recognized by you.

13. "Customer" means any person or entity who purchases or has purchased goods or services from you or another designated person.

14. "Client" means any customer or person contacted by you or another designated person in an effort to make that person a customer.

15. "Identify", "identification" or "identity" means:

a. As to a person: name, business, residential address(es), occupation, job title and dates so employed; and if not an individual, state the type of entity and the address of its principal place of business;

b. As to a document: the type of document (e.g., letter, memorandum, book, telegram, application, chart, report, etc.), the identity of the author or originator, the date authorized or originated, the identity of each person to whom the original or copy was addressed, delivered, or disseminated, the identity of such person known or reasonably believed by you to have the present

possession, custody or control thereof, and a brief description of the subject matter thereof, all with sufficient particularity to request its production under Rule 3120 of the Civil Practice Laws and Rules;

c. As to communication: the date of the communication, the type of communication (e.g., telephone conversation, meeting, etc.), the place where the communication took place, the identity of the person who made the communication, the identity of each person who received the communication and of each person present when it was made and the subject matter discussed; and

d. As to a meeting: the date of the meeting, place of the meeting, each person invited to the meeting, each person who attended the meeting, and the subject matter discussed.

16. "Or" shall be construed either conjunctively or disjunctively to bring within the scope of these demands any information which might otherwise be construed to be outside their scope.

The singular includes the plural and vice versa. The masculine includes the feminine and neuter genders. The past tense includes the present tense when clear meaning is not distorted by change of tense.

If you do not answer a demand because of a claim of privilege, set forth the privilege claimed, the facts upon which you reply to support the claim of privilege, and identify all documents for which such privilege is claimed.

Documents to be Produced

1. Any and all email, correspondence or documentation relating to the DT Ratio experiment being conducted at the University of Rochester, Laboratory

for Laser Energetics (hereinafter "LLE") on August 6, 2008, including but not limited to the following:

a. Draft and final Target Request Forms.

b. Draft and final experiment proposals or experiment proposal templates.

c. Draft and final Shot Request Forms.

d. Minutes of or notes taken any meetings relative to the DT Ratio experiment.

e. VISRAD files.

f. Experiment Reviews.

g. Draft and final Shot Effectiveness Forms.

h. Draft and final Experimental Critiques.

i. Minutes of or notes taken at any meetings relative to the accident resulting in Plaintiff's injuries.

2. Any and all email, correspondence or documentation exchanged by and/or between the University of Rochester, Los Alamos National Security LLC, AWE, Plc., and/or Massachusetts Institute of Technology (or related parties) relative to the DT Ratio experiment conducted on August 6, 2008 or the cause of the accident resulting in Plaintiff's injuries.

3. Any and all policies, procedures, rules and/or regulations in existence at the University of Rochester as of August 6, 2008 relative to experiments being conducted at LLE including but not limited to:

a. Office of Research and Project Administration policies, procedures, rules and/or regulations.

b. Laser Facility Organization and Regulations Manual.

c. National Laser Users' Facility-Users' Guide.

d. Statement of the Research Policy Committee.

4. Any and all plans, specifications, drawings or other documentation relative to the design, constructions, use, maintenance or repair of the light pipe diagnostic and its carbon dioxide gas pressurization equipment in use on August 6, 2008.

5. Any and all photos or videos taken of Plaintiff, any equipment or any area at the LLE on August 6, 2008.

6. Any and all email, correspondence or documentation exchanged by or between the University of Rochester and any agency investigating the accident resulting in Plaintiff's injuries including but not limited to OSHA.

7. Any data recorded by the light pipe diagnostic in use on August 6, 2008.

This document demand is a continuing one; if additional information becomes available, please supplement your response accordingly.

Dated: February 7, 2012

Louis J. Micca, Esq.
Attorney for Plaintiff
11 State Street
Pittsford, New York 14534
Tel: (585) 899-6031

TO: Beryl Nusbaum, Esq.
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Attorneys for Los Alamos National Security LLC
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Eric J. Ward, Esq.
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UNITED STATES DISTRICT COURT
WESTERN DISTRICT OF NEW YORK

SAMUEL M. ROBERTS,

Plaintiff,

-vs.-

Civil No. 11 CV 6206L

LOS ALAMOS NATIONAL SECURITY, LLC., AWE, PLC., MASSACHUSETTS INSTITUTE OF TECHNOLOGY,

Defendants,
Third-Party Plaintiffs,

-vs.-

UNIVERSITY OF ROCHESTER

Third-Party Defendant.

CERTIFICATE OF SERVICE

I hereby certify that on February 7, 2012, I served a true and accurate copy of the foregoing Rule 36 Requests for Admission, by placing a true copy thereof enclosed in a post-paid wrapper in a depository, under the exclusive custody and control of the United State Postal Service, addressed to:

Beryl Nusbaum, Esq.
Woods, Oviatt, Gilman, LLP
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700 Crossroads Building,
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Rochester, New York 14614

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Louis J. Micca

EXHIBIT B

UNITED STATES DISTRICT COURT
WESTERN DISTRICT OF NEW YORK

SAMUEL M. ROBERTS,

Plaintiff,

vs.

LOS ALAMOS NATIONAL SECURITY, LLC, AWE, PLC., MASSACHUSETTS INSTITUTE OF TECHNOLOGY,

Defendants,
Third-Party Plaintiffs,

vs.

UNIVERSITY OF ROCHESTER

Third-Party Defendant.

RESPONSE TO PLAINTIFF'S FIRST DEMAND FOR DISCOVERY AND INSPECTION

Civil No. 11 CV 6206L

Defendant/Third-Party Plaintiff, Los Alamos National Security, LLC (hereinafter "Los Alamos"), by and through its attorneys, Woods Oviatt Gilman LLP, responds to Plaintiff's First Demand for Discovery and Inspection, as follows:

PRELIMINARY STATEMENT

By responding to Plaintiff's Demand, Defendant Los Alamos does not waive any objections it may have regarding the use of information regarding the truth or accuracy of any characterizations or assumptions contained in the Demand. Defendant Los Alamos reserves its rights to make all objections identified herein or object on other grounds as to the use or admissibility of the information provided, in whole or in part, or the subject matter covered thereby, in any proceeding or trial or in any other action. Defendant Los Alamos reserves its right to object on any and all proper grounds and it, in no way, admits as to the authenticity, competency, relevance, materiality or admissibility of any of the information provided herein.

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700 Crossroads Building
2 State Street
Rochester, New York 14614

The responses of Defendant Los Alamos are, and will be, based upon information acquired thus far, and Defendant Los Alamos reserves the right to amend or supplement its responses in accordance with the Federal Rules of Civil Procedure and the Local Rules of this Court. By responding to this Demand, Defendant Los Alamos does not waive any objections it may have with regard to Plaintiff's use of the information or regarding the truth or accuracy of any characterizations or assumptions contained in Plaintiff's Demand. Defendant Los Alamos reserves its right to make all objections identified herein or object on the grounds, comment as to the use or admissibility of information provided, in whole or in part, or the subject matter covered thereby, in any proceeding or trial or any other action. Defendant Los Alamos reserves its right to object on any and all proper grounds and it in no way admits the authenticity, competency, relevance, materiality or admissibility of any of the information provided herewith.

The responses of Defendant Los Alamos are, and will be, based on the information acquired thus far, and it reserves the right to supplement its responses in accordance with the Federal Rules of Civil Procedure and the local rules of this Court.

GENERAL OBJECTIONS

1. Defendant Los Alamos objects to each request, instruction or definition to the extent that any of them seek to impose any obligation beyond that required by the Federal Rules of Civil Procedure or the Local Rules of this Court.

2. Defendant Los Alamos objects to each request to the extent it could be construed to seek information which may be covered by the attorney-client privilege, the work-product privilege, or any other applicable privilege doctrine.

3. Defendant Los Alamos objects to each request to the extent that it may be construed to seek information which is proprietary and/or confidential or otherwise restricted from disclosure to the general public.

4. Defendant Los Alamos objects to each demand that does not specify a time frame on the ground that such demands are overbroad and not reasonably calculated to lead to the discovery of admissible evidence.

5. Defendant Los Alamos objects to each demand to the extent that it purports to require the discovery of information not within its possession, custody, or control.

6. Defendant Los Alamos objects to any interpretation of each demand to the extent that it calls for information that does not refer to or relate to matters alleged in the above-captioned action.

7. Defendant Los Alamos objects each demand to the extent the Notice to Produce seeks information that is neither relevant nor reasonably calculated to lead to the discovery of admissible evidence.

9. Unless otherwise specified, all general objections apply to each numbered answer as if each general objection was specifically set forth therein.

RESPONSES TO SPECIFIC DEMANDS

1. Any and all email, correspondence or documentation relating to the DT Ratio experiment being conducted at the University of Rochester, Laboratory for Laser Energetics (hereinafter "LLE") on August 6, 2008, including but not limited to the following:

a. Draft and final Target Request Forms.

b. Draft and final experiment proposals or experiment proposal templates.

c. Draft and final Shot Request Forms.

d. Minutes of or notes taken any meetings relative to the DT Ratio experiment.

e. VISRAD files.

f. Experiment Reviews.

g. Draft and final Shot Effectiveness Forms.

h. Draft and final Experimental Critiques.

i. Minutes of or notes taken at any meetings relative to the accident resulting in Plaintiff's injuries.

Response:

Defendant Los Alamos objects to this demand as excessive overbroad and unduly burdensome. The DT Ratio campaign encompasses a multi-year project and was not limited to any one day experiment. As stated, the demand is far too broad to allow Defendant Los Alamos to respond in any meaningful manner. Further, as stated, the demand seeks substantial quantities of information that has absolutely no relevance to the events that took place on the day of the plaintiff was injured or to the facility used on that day. The demand seeks information that is technical in nature, which is so far removed from the controversy in dispute that Defendant Los Alamos cannot meaningfully provide more detailed objections. At the time of the Plaintiff's injuries, it is undisputed that Plaintiff was involved in working with equipment developed, designed, built, installed, maintained, and operated by Third-Party Defendant University of Rochester, and therefore, this demand appears more properly directed towards the work being conducted by that party on the day in question, and Defendant Los Alamos is not the proper party to respond. To the extent that it is undisputed that Plaintiff was not in any physical proximity to any equipment involved in any of Defendant Los Alamos' experiments at the time

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of his injuries, Defendant Los Alamos' work on that day is entirely unrelated to the events which are the subject of this action. To the extent that this demand could be construed so broadly as to include attorney-client privileged documents or documents subject to the work-product privilege, Defendant Los Alamos interprets this request to exclude obviously privileged material connected to this litigation. Defendant Los Alamos further objects to this demand as confusing insofar as a number of the subsections lack context to afford a meaningful reference. In the event that Plaintiff propounds specific and more narrowly targeted requests for specific relevant documents, Defendant Los Alamos reserves the right to amend and/or supplement its responses. Defendant Los Alamos further refers to its initial disclosures, which may be construed to fall within the scope of this demand.

2. Any and all email, correspondence or documentation exchanged by and/or between the University of Rochester, Los Alamos National Security LLC, AWE, Plc., and/or Massachusetts Institute of Technology (or related parties) relative to the DT Ratio experiment conducted on August 6, 2008 or the cause of the accident resulting in Plaintiff's injuries.

Response:

Defendant Los Alamos objects to Demand No. 2 as duplicative of Demand No. 1 and incorporates all objections stated to Demand No. 1 as fully restated herein. In addition, Defendant Los Alamos objects to this request to the extent that it could be interpreted to include correspondence and proceedings previously exchanged in this litigation between counsel for the respective parties identified, all of which is already in possession of Plaintiff's counsel and of which it would be unduly burdensome and improper to seek reproduction.

3. Any and all policies, procedures, rules and/or regulations in existence at the University of Rochester as of August 6, 2008 relative to experiments being conducted at LLE

Woods Oviatt Gilman LLP
700 Crossroads Building
2 State Street
Rochester, New York 14614

including but not limited to:

a. Office of Research and Project Administration policies, procedures, rules and/or regulations.

b. Laser Facility Organization and Regulations Manual.

c. National Laser Users' Facility-Users' Guide.

d. Statement of the Research Policy Committee.

Response:

Defendant Los Alamos objects to Demand No. 3 as improperly directed to it to the extent that the request seeks information under the direct control and apparent authorship of the University of Rochester.

4. Any and all plans, specifications, drawings or other documentation relative to the design, constructions, use, maintenance or repair of the light pipe diagnostic and its carbon dioxide gas pressurization equipment in use on August 6, 2008.

Response:

Defendant Los Alamos objects to this demand to the extent that the subject matter of the demand appears to be more properly directed to parties that have a connection to the light pipe diagnostic. Upon information and belief, this demand is more properly directed to the University of Rochester. The light pipe diagnostic referred to by this demand was not a project of Defendant Los Alamos and Defendant Los Alamos was not involved in the development, specifications, drawings, designs, construction, use, maintenance or repair of the light pipe diagnostic or its carbon dioxide gas pressurization equipment. Defendant Los Alamos further objects to this demand as overly burdensome to the extent that this demand could be interpreted to include documents exchanged in this litigation which have already been produced by other

parties or referred to by other parties in their initial disclosures.

5. Any and all photos or videos taken of Plaintiff, any equipment or any area at the LLE on August 6, 2008.

Response:

Defendant Los Alamos objects to this demand as overly broad to the extent that it refers to "any equipment or any area at the LLE" as this demand was so broad as to encompass significant areas of the LLE that have nothing to do with the incidents at issue which took place on August 6, 2008. Subject to and without waiving the foregoing objection, Defendant Los Alamos has not identified any responsive materials within its possession and control.

6. Any and all email, correspondence or documentation exchanged by or between the University of Rochester and any agency investigating the accident resulting in Plaintiff's injuries including but not limited to OSHA.

Response:

Defendant Los Alamos objects to this demand to the extent it is more properly directed to the University of Rochester based on the subject matter of the demand. Defendant Los Alamos has no personal knowledge regarding the scope of email, correspondence or documentation exchange by or between the University of Rochester and any agency investigating the accident at issue.

7. Any data recorded by the light pipe diagnostic in use on August 6, 2008.

Response:

Defendant Los Alamos objects to this demand as unclear and as lacking any meaningful connection or relevance to the subject matter of this litigation. Defendant Los Alamos objects to this demand as seeking information more properly directed to the University of Rochester.

Subject to and without waiving the foregoing objection, Defendant Los Alamos has not identified any information responsive to this request.

The Defendant/Third-Party Plaintiff Los Alamos National Security, LLC reserves the right to amend and/or supplement its responses to these requests as may be appropriate.

Dated: February 24, 2012
Rochester, New York

WOODS OVIATT GILMAN LLP

By: _____

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UNITED STATES DISTRICT COURT
WESTERN DISTRICT OF NEW YORK

SAMUEL M. ROBERTS,

Plaintiff,

v.

LOS ALAMOS NATIONAL SECURITY, LLC, AWE, PLC, and MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Civil No. 11 CV 6206L

Defendants,

v.

UNIVERSITY OF ROCHESTER,

Third-Party Defendant.

CERTIFICATE OF SERVICE

I hereby certify that on February 24, 2012, I caused to be served a true and accurate copy of the foregoing Defendant Los Alamos National Security, LLC's Response to Plaintiff's First Demand for Discovery and Inspection, by placing a true copy thereof enclosed in a post-paid wrapper in a depository, under the exclusive custody and control of the United States Postal Service, addressed to:

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EXHIBIT C

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March 7, 2012

Louis J. Micca, Esq.
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Pittsford, New York 14534

Re: Samuel Roberts v. Los Alamos National Security, LLC, et al. v. University of Rochester
Civil Case No.: 11-cv-6206(L)

Dear Lou:

Enclosed is a CD containing electronic copies of all Rule 26 disclosure documents in the possession of Los Alamos National Security, LLC.

Very truly yours,

WOODS OVIATT GILMAN LLP

Beryl Nusbaum

/bsb
Enclosure

cc: Christine Tramontano, Esq. *(w/enc.)*
David Rothenberg, Esq. *(w/enc.)*
Eric J. Ward, Esq. *(w/enc.)*

LLEINST 3000D

OMEGA

LASER FACILITY

ORGANIZATION & REGULATION

MANUAL

Record of Changes and List of Effective Pages

Record of Changes

Change/ Rev. No.	Entered by	Date of Entry	Change/ Rev. No.	Entered by	Date of Entry
A	Complete Revision	1/15/96			
B	Complete Revision	1/27/97			
C	Complete Revision	3/11/98			
1	Page IV-10	6/17/98			
2	S. Loucks	3/9/99			
3	E. Walker	1/20/00			
D	Complete Revision	2/9/01			
1	S. Loucks	2/8/02			
2	S. Loucks	12/2/02			
3	S. Loucks	1/31/03			
4	S. Loucks	10/31/03			
5	S. Loucks	2/9/04			

List of Effective Pages

Page No.	Change/Rev. No. and Date
i	Revision D CH5 9 February 2004
ii	Revision D CH5 9 February 2004
iii	Revision D CH2 2 December 2002
iv	Revision D CH5 9 February 2004
v	Revision D CH5 9 February 2004
I-1	Revision D CH5 9 February 2004
I-2	Revision D CH1 8 February 2002
I-3	Revision D CH1 8 February 2002
I-4	Revision D 9 February 2001
I-5	Revision D CH4 31 October 2003
I-6	Revision D CH5 9 February 2004
I-7	Revision D CH5 9 February 2004
I-8	Revision D CH3 31 January 2003
I-9	Revision D CH3 31 January 2003
I-10	Revision D CH3 31 January 2003
I-11	Revision D CH3 31 January 2003
I-12	Revision D CH5 9 February 2004
II-1	Revision D CH2 2 December 2002
II-2	Revision D CH5 9 February 2004
II-3	Revision D CH5 9 February 2004
II-4	Revision D CH5 9 February 2004
II-5	Revision D CH5 9 February 2004
II-6	Revision D CH5 9 February 2004
II-7	Revision D CH5 9 February 2004
II-8	Revision D CH5 9 February 2004
II-9	Revision D CH5 9 February 2004
II-10	Revision D CH5 9 February 2004
II-11	Revision D CH5 9 February 2004
II-12	Revision D CH2 2 December 2002
III-1	Revision D CH3 31 January 2003
III-2	Revision D CH2 2 December 2002
III-3	Revision D CH2 2 December 2002
III-4	Revision D 9 February 2001
III-5	Revision D 9 February 2001
III-6	Revision D 9 February 2001
III-7	Revision D CH3 31 January 2003
III-8	Revision D CH3 31 January 2003
III-9	Revision D CH3 31 January 2003
III-10	Revision D CH3 31 January 2003
III-11	Revision D CH3 31 January 2003
III-12	Revision D CH3 31 January 2003
III-13	Revision D CH3 31 January 2003
III-14	Revision D CH3 31 January 2003
III-15	Revision D CH3 31 January 2003
III-16	Revision D CH3 31 January 2003
III-17	Revision D CH3 31 January 2003
III-18	Revision D CH3 31 January 2003
III-19	Revision D CH3 31 January 2003
III-20	Revision D CH3 31 January 2003
III-21	Revision D CH3 31 January 2003
III-22	Revision D CH3 31 January 2003
III-23	Revision D CH3 31 January 2003
III-24	Revision D CH3 31 January 2003
III-25	Revision D CH3 31 January 2003
III-26	Revision D CH3 31 January 2003
III-27	Revision D CH3 31 January 2003
IV-1	Revision D 9 February 2001
IV-2	Revision D 9 February 2001
IV-3	Revision D CH5 9 February 2004
IV-4	Revision D CH1 8 February 2002
IV-5	Revision D CH5 9 February 2004
IV-6	Revision D CH1 8 February 2002
IV-7	Revision D CH1 8 February 2002
IV-8	Revision D CH1 8 February 2002
IV-9	Revision D CH1 8 February 2002
IV-10	Revision D 9 February 2001
IV-11	Revision D 9 February 2001
IV-12	Revision D 9 February 2001
IV-13	Revision D 9 February 2001
IV-14	Revision D CH1 8 February 2002
IV-15	Revision D 9 February 2001
IV-16	Revision CH5 9 February 2004

List of Acronyms

ALT	Alignment/Laser Technician
BO	Beamlines Operator
BWA	Blast Window Assembly
CFR	Code of Federal Regulations
CPR	Cardio-Pulmonary Resuscitation
CTD	Cryogenic Target Detector
CTHS	Cryogenic Target Handling System
DDC	Digital Direct Control
DER	Driver Equipment Room
DOE	Department of Energy
ECT	Experimental Cryogenic Technician
ESO	Experimental System Operator
EST	Experimental System Technician
GDL	Glass Development Laser
HED	Harmonic Energy Diagnostic
HTS	Hardware Timing System
ICF	Inertial Confinement Fusion
IR	Infrared
LDO	Laser Drivers Operator
LDT	Laser Drivers Technician
LF	Laser Facility
LFM	Laser Facility Manager
LIM	Linear Induction Motor
LON	Local Operating Network
LLE	Laboratory for Laser Energetics
MCTC	Moving Cryostat Transfer Cart
NLUF	National Laser Users Facility
OOC	Out-of-Commission
OSHA	Occupational Safety and Health Administration
PC	Personal Computer
PCO	Power Conditioning Operator
PCT	Power Conditioning Technician
PCU	Power Conditioning Unit
PGR	Pulse Generation Room
PI	Principal Investigator
PLC	Programmable Logic Controller
SAD	Safety Analysis Document
SD	Shot Director
SSD	Smoothing by Spectral Dispersion
SVS	Shroud Viewing System
T	Ton
TED	Target Existence Detector
UR/LLE	University of Rochester/Laboratory for Laser Energetics
UV	Ultraviolet

Table of Contents

Part I
Concept of Operations and Scheduling

1000 Laser Facility Overview

The Laser Facility houses the OMEGA laser system. The OMEGA laser is a 60-beam neodymium glass laser that is frequency converted to deliver up to 30 kJ of 351 nm light on target. This system is capable of conducting fully diagnosed direct-drive or indirect-drive target physics experiments, including direct-drive planar or spherical cryogenic experiments. The system is designed to operate on a one-hour shot cycle and will normally deliver 1000 shots per shift per year.

The laser was funded by the Department of Energy (DOE) and is housed in the University of Rochester-owned Laboratory for Laser Energetics' facility located on the South Campus of the University of Rochester. The facility is operated under a Cooperative Agreement between the Department of Energy and the University of Rochester's Laboratory for Laser Energetics (UR/LLE). Under this Agreement the UR/LLE also operates the National Laser Users Facility (NLUF). Shots are made available to NLUF users on the OMEGA laser system; however, the NLUF users are funded by DOE outside of the DOE–UR/LLE Cooperative Agreement.

1001 Science Program Committee

The Laboratory for Laser Energetics's (LLE) Science Program Committee is responsible for LLE's direct-drive scientific program direction. The organization of this committee is shown in Fig. I-1 and its chairman is appointed by the Laboratory Director. This committee functions in a collegial fashion to provide guidance to the Laboratory and to make recommendations to the Laboratory Director on LLE's overall program direction. Its specific responsibilities include:

- Make recommendations to the OMEGA Scheduling Committee as to LLE experiments to be performed and their relative priorities.
- Formulate LLE's annual Work Plan.
- Formulate and maintain up-to-date long range program plans of five and ten years.

- Brief or provide a written report of its recommendations to the LLE Director and other LLE Division Directors. If a consensus view is not reached within the committee, all views will be represented.

OMEGA Scientific Program Committee

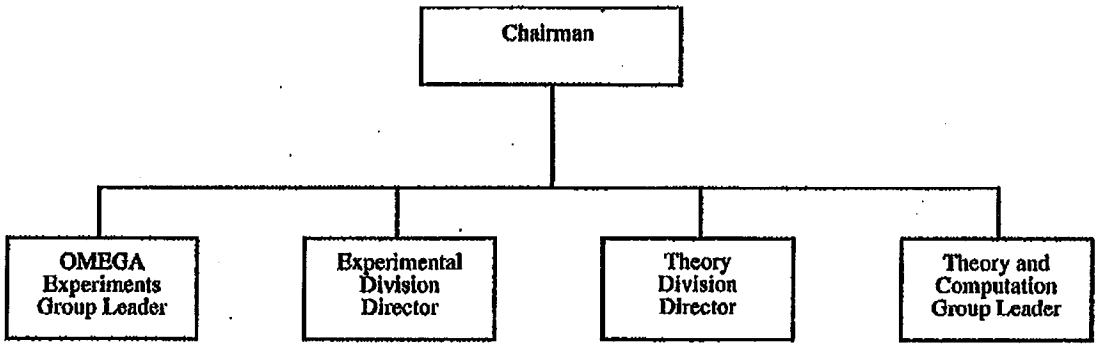

Figure I-1

1002 Scheduling Committee Roles and Responsibilities

The Laboratory for Laser Energetics' (LLE) OMEGA Scheduling Committee is responsible for establishing, on a fiscal-year basis, the schedule of experiments to be conducted on the OMEGA laser system. In addition to the planned experiments, regular system maintenance and laser and/or target area upgrades or modifications will also be included in this schedule. The organization of this committee is shown in Fig. I-2. [The non-LLE members of the committee will be proposed by their respective inertial confinement fusion (ICF) program managers.] It is the responsibility of the LLE Experimental Division Director to appoint a member from that division to be the LLE liaison for all non-LLE experiments so as to facilitate the coordination of the planning and actual execution of the experiments at LLE. In addition to the above responsibilities this committee will (1) ensure the assignment of an experimental coordinator to each scheduled experiment; (2) assure the safety of specified experiments, especially with respect to targets, materials, and special pointing or laser conditions; (3) follow the progress of the preparation for and the execution of approved experiments; and (4) monitor the status of system maintenance and scheduled laser and target area upgrades and modifications.

In July of each year, the OMEGA Scheduling Committee will establish the OMEGA facility schedule for the following fiscal year. To accomplish this they will be provided scheduling information by the LLE Scientific Program Committee for LLE experiments,

by the NLUF manager for NLUF experiments, by a subcommittee made up of National Laboratory representatives appointed by the LLE Director for National Laboratory experiments, and by the OMEGA Laser Facility Manager for system configuration and maintenance requirements. As a minimum, a listing of experiments to be conducted for the fiscal year under consideration will be provided. This listing should be by campaign (e.g., planar imprinting, cylindrical hohlraum indirect drive, SSP, etc), giving the nominal shot days (equivalent 12-hr days) required for each campaign and the minimum time between shot days for like campaigns. Additionally, the following information should be given for each campaign:

- Principal Investigators
- Experimental objective
- Number of beams required
- Backlighting requirements, by dual drivers or by one driver with beam delays
- Targeting, target chamber center, or other
- Special diagnostic requirements, e.g., those that are not standard
- Distributed phase plate and distributed polarization rotator requirements
- Pulse shape

Once the facility schedule is established it will be placed on LLE's World Wide Web home page and Principal Investigators will be informed when their experiments are scheduled.

As part of the monitoring process this committee will meet on a biweekly basis to review experiment proposals and critiques and the status of the laser system schedule. The Laser Facility Manager will provide a status report to the committee of the current and planned activities on the system. If during these biweekly meetings the committee determines that a previously approved experiment or system modification or upgrade will not be able to be conducted in the original time period allotted, the committee will attempt to reschedule that activity or, if necessary, drop that previously approved activity from that fiscal year's schedule. Since it is fully expected that non-LLE members of this committee will be unable to attend all of these biweekly meetings, it will be the responsibility of the chairman of this committee to consult and discuss with non-LLE members any proposed changes to the schedule.

OMEGA Scheduling Committee

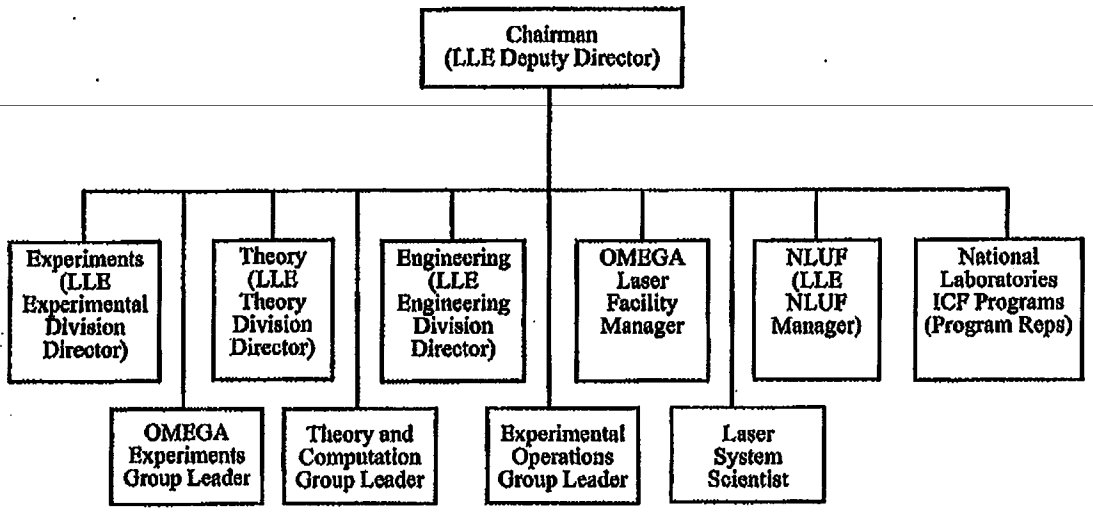

Figure I-2

1003 Principal Investigator Roles and Responsibilities

With respect to the Laser Facility, principal investigators (PI's) are those individuals responsible for proposing experiments to be conducted on the OMEGA laser system. Once an experiment is scheduled by the OMEGA Scheduling Committee, the PI is responsible for submitting a proposal template two months in advance of the time the experiment is scheduled, coordinating experimental and laser requirements, preparation of Shot Request Forms (SRF's), monitoring the actual execution, and writing a critique of the execution of the experiment within one week of its performance. Principal investigators are responsible for submitting a written experiment proposal template to the OMEGA Scheduling Committee that amplifies and extends the information submitted prior to scheduling the experiment. This template must be received at least two months prior to the conduct of the experiment and will initiate the preparation phase for the experiment. The written proposal template should detail the following information:

I. Experiment title, principal investigator's name, and, if related to LLE direct-drive experimental program, which category (i.e., ISE, RTI, etc.) the experiment falls under.

II. Summary of the experiment's objectives.

III. Laser conditions required for the experiment
- pulse shape
- SSD, DPP, and DPR conditions
- power/energy balance

- number of beamlines and target pointing summary requirements
- backlighting requirements and beam timing delays
- special laser conditions

IV. Diagnostics required and target chamber port assignments (indicate any non-LLE-provided diagnostics)

V. A. Type and number of targets including number of spares and a diagram of each type of target (this section must be completed even if using non-LLE-provided targets). NOTE: if special targets are required, they must be specified more than two months in advance. Additionally, special target geometries may require metrology prior to delivery to LLE and verification after arrival at LLE using LLE's Powel scope.

B. Estimated Laser Transmission Through Target:

Significant transmission of laser light through a target can cause damage to the opposed beam optics. A beam transmitted through an underdense target can have significant spatial modulation. The potential for such damage is increased when a DPP is used in a beam. To assess the potential for such damage, the PI is required to state the estimated level of laser beam transmission through the target (including blow-through) for the proposed experimental configuration. The basis of this estimate can be a simulation of the laser-target interaction or data from an experiment that closely simulates the proposed experimental configuration. No experiment will be approved unless such as estimate is provided in the template submitted for approval to the OMEGA Scheduling Committee two months prior to the scheduled shot day. Beam dumps or calorimeters can be installed in opposing beams to increase the maximum acceptable energy transmission (for up to six beams). The following matrix shows the maximum allowable blow-through under various scenarios:

DPP in either target or opposing beam?	Beam block (in opposing beam?)	Maximum acceptable energy transmission
Yes	No	20 J
Yes	Yes	200 J
No	No	100 J
No	Yes	300 J

VI. Number of desired laser shots.

VII. Special shot schedule considerations associated with experiment.

The proposal templates will be reviewed by the OMEGA Scheduling Committee to ensure that the experiment's requirements are consistent with the OMEGA facility's capabilities.

Once the principal investigator's experiment has been scheduled, it will become the PI's responsibility to interface (via the Experimental Division liason representative for user experiments) with the assigned experimental coordinator, and ultimately with the Laser Facility Manager, the Experimental Operations Group, the Optomechanical System Group, and the LLE Target Fabrication Group (while keeping the experimental coordinator and liason representative informed) to assure that the experimental and laser system requirements are coordinated and understood (see Fig. I-3). If a principal investigator uses targets and/or diagnostics not provided by LLE resources, or requires a pulse shape that is not in the LLE inventory, the PI must coordinate those respective requirements through the corresponding LLE groups to assure that at the time the experiment is to be conducted issues associated with availability or compatibility of those non-LLE-provided resources have been resolved.

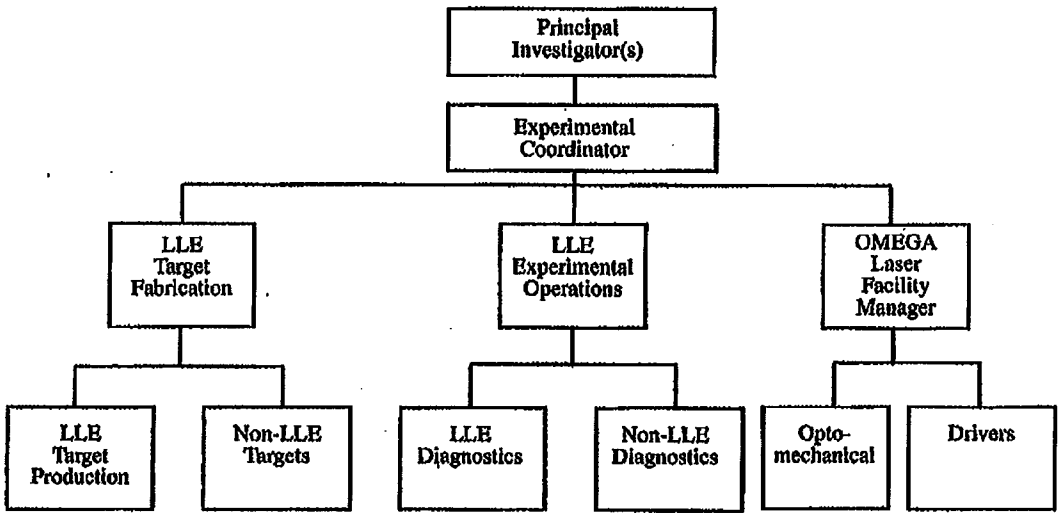

Figure I-3

Approximately two weeks prior to commencing the experiment the PI, or designee, will conduct a comprehensive review of the detailed requirements for their upcoming campaign. This review is for the mutual benefit of the laser and experimental operations group leaders, and the scientists involved with laser and diagnostic systems. The PI shall submit Shot Request Forms that define each unique shot configuration prior to this meeting. (See Section 4008 "Shot Request Forms and Administration" for more on the forms.)

By the close of business on the Monday prior to the week of target shots, final Shot Request forms should be submitted to the Laser Facility Manager. The Laser Facility Manager shall be notified of subsequent changes prior to the initiation of the shot by the operations crew. Any special requirements for set up of the diagnostics for the first shot should be clearly indicated; for example, modifications to the TIM set-up sheets.

At the beginning of each shot day of the campaign, the PI will support the shift briefings as appropriate.

During the actual execution of the experiments the principal investigator will act as an advisor to the LLE Shot Director and may be called upon to render advice on whether to proceed with planned experiments in the event of abnormal system performance. The Shot Director is in charge of the overall laser and target systems during a shot series. If issues associated with safety (personnel or equipment) arise during an experimental sequence, the shot director can abort that shot or even the whole series if warranted.

Once the experiment (or sub-series of the experiment) has been conducted, it will also be the responsibility of the principal investigators to provide to the OMEGA Scheduling Committee [within one week after the experiment (or sub-series) has been conducted] a written critique of the performance of the experiment and facility. The following items should be included:

Problems encountered
- Laser
- Experimental diagnostics
- Experimental
- Target

Suggestions for improvements
Positive feedback

1004 Laser Facility Operations Overview

All aspects of OMEGA shot operations will be under the direction and control of the OMEGA Facility Operations organization shown in Fig. I-4. The Shot Director, under the overall direction of the Laser Facility Manager, heads up the OMEGA Shot Operations watch organization. This watch organization will directly control the actual shot operations and will be responsible for safety, shot execution, and data collection.

The full shot watch organization, unlike the divisional administrative organization, is only operative during actual shot operations. Personnel qualified for and assigned to these watches during specific periods of time may come from any of the Laboratory's divisions. While assigned to a watch, however, they report to and are directed by the Shot Director until relieved.

For actual shot operations the watch organization shown in Fig. I-4 must be manned to the extent detailed in Sec. 2011. During non-shot (maintenance and/or scheduled system modifications or upgrades) periods only the Shot Director will be stationed.

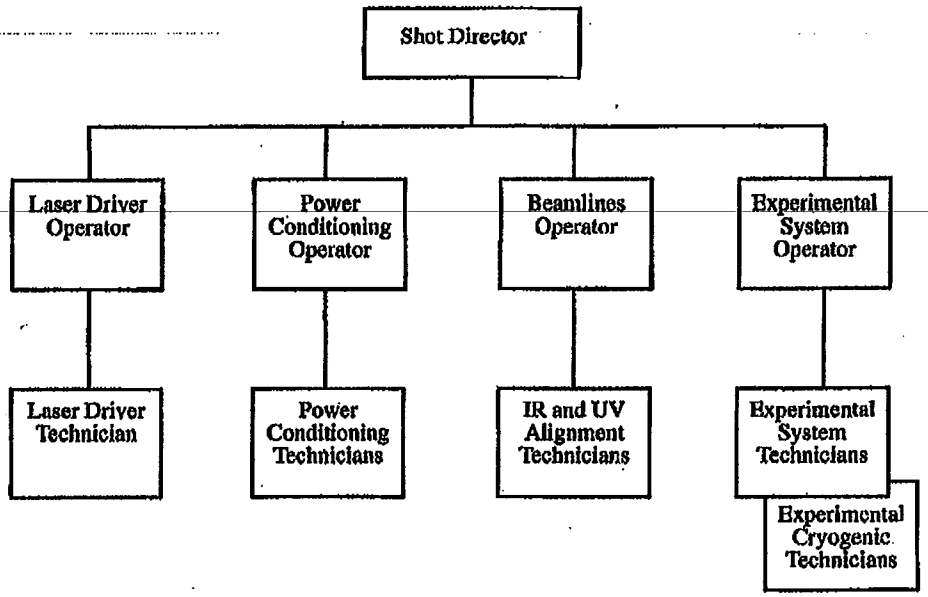

Figure I-4

System corrective and preventive maintenance will be scheduled and performed by the existing Laboratory administrative divisional organization. Divisional responsibilities for services (e.g., mechanical design, electronics design, computer software, etc.) and equipment/systems are detailed below. Where equipment and systems cross divisional lines, one lead Division is assigned the overall responsibility. Corrective and preventive maintenance will be scheduled in consonance with the Laser System Schedule approved by the OMEGA Scheduling Committee. Scheduled divisional maintenance will be approved by the Group Leader designated by the Division Director. The Laser Facility Manager or person appointed by him will review, track, and monitor the scheduling and completion of all key scheduled maintenance actions.

To ensure the operational readiness of the OMEGA Laser Facility, including laser, target, and building support systems, the placing of major equipment or systems (those that would prevent completing a fully diagnosed target shot) out of commission will be controlled by the OMEGA Shot Operations watch organization under the direction of the Laser Facility Manager. The divisional representative will obtain permission from the on-watch Shot Director prior to placing a major equipment or system out of commission. The return of equipment and systems to commission after maintenance will also be reported to the Shot Director. The Shot Director will maintain a log indicating the current status of equipment placed out of commission.

OMEGA Laser Facility service and equipment responsibilities are as follows:

Engineering Division

Services
- Mechanical design
- Electronics design
- Optical Manufacturing shop
- Optical Fabrication shop
- Electronics shop
- Machine shop
- Clean room (laser and target bay)
- Film Processing

Equipment/Systems
- Laser drivers-main, SSD, backlighter, and fiducial (oscillators, pulse shaping, driver line)
- Laser amplifiers
- Laser amplifier structures (service cranes, etc.)
- Deionized water and glycol cooling systems (including controls, indications, purification)
- Nitrogen purge system
- Power conditioning
- Hardware timing system
- Laser control system (including interfaces, cabling, card cages, neuron modules, cable converters, and PLC subsystems less SUN workstations and displays, alignment video system)
- Laser optomechanical elements (alignment sensors, polarization control optics, mirrors, beam splitters, flip-in devices, spatial filters, path-length adjusters,)
- Laser beamline diagnostics (HBD spectrograph, UV transport calibration, beam timing, pulse shape, pulse contrast)
- Frequency conversion
- Periscope mirror assembly
- Infrared alignment
- Ultraviolet alignment
- F-alignment sensor package
- Focus lens subassembly
- Blast window assemblies, distributed phase plates, distributed polarization rotators
- Structures
- Interlock system (door interlocks, motion detectors, warning light and alarm controls, dump system)
- Grounding system
- Experimental target diagnostic peripherals (e.g. nose cones, filters, pin holes, etc.)
- Spatial filter vacuum system
- Radio communication system
- Experimental control and data acquisition

Target chamber
Target chamber vacuum system
Target positioning
Target viewing
Radiation detection system

Experimental Division

Services
Target production
Film digitizing

Equipment/Systems
Experimental target diagnostics
Target filling
Target transport
Tritium removal systems

Theory Division

Services
Software development and maintenance
Computing and networking

Equipment/Systems
SUN workstations and displays
Alignment video system
Control system software
PC's
Imaging hardware
(Non-LON) network wiring and hub equipment

Administration Division

Services
Purchasing
Accounting
Personnel services
Administrative services
Facility improvements

Equipment/Systems
Deionized water and glycol pumps, motors, and heat exchangers
Heating, ventilation, air-conditioning system, and DDC system
Electrical distribution (switch gear, motor control centers, power panels, breakers, distribution to connected equipment, emergency diesel generator, 750 kVA and its distribution to PCU's)
Target bay 10-T crane

Target bay elevator
Public address system
Pneumatic air system

1005 Laser Facility Manager

The Laser Facility Manager is responsible for the overall operation and operational readiness of the OMEGA Laser System. The Laser Facility Manager reports to the LLE Engineering Division Director and has the following specific responsibilities:

Manage the Laser Facility to ensure that the OMEGA Laser System is fully ready to execute the schedule of experiments proposed by the OMEGA Scheduling Committee and approved by the Director of LLE.

Direct Laser Facility operations to ensure operations are conducted effectively and safely.

Directly supervise the Shot Director to ensure that he/she fulfills his/her responsibilities in operating the Laser Facility.

Coordinate with System Engineering for the preparation and submission of written procedures covering shot operations to the LLE Engineering Division Director for approval. Approve written change notices as required to clarify or amend these procedures in advance of the approval of a formal revision by the LLE Engineering Division Director.

Manage and control all Laser Facility maintenance to ensure operational readiness.

Make recommendations regarding the procurement of all Laser Facility services, operating equipment spares and supplies, and system upgrade components.

Be responsible for the overall system configuration control and management.

Directly manage watchstander training and qualification and certify the qualification of the Shot Director.

Serve as a member of the OMEGA Scheduling Committee and provide this committee with a periodic report of system status and the status of completing scheduled experimental operations.

Approve the Laser Facility watchbill.

Maintain a list of Laser Facility qualified watchstanders.

Provide daily written directions for Laser Facility operations in a Laser Facility Manager's Day Order Book.

1006 Laser System Scientist

The Laser System Scientist is responsible for the safe propagation of the laser. The Laser System Scientist reports to the LLE Engineering Division Director and has the following responsibilities:

Support the preparation, qualification, and operation of the laser in close coordination with the Laser Facility Manager and Shot Director. He is normally available on site during daily system qualification, short pulse operations, and when precision or unique energy balance is required. When not on site he should normally be accessible by pager and phone.

Qualify the laser beam spatial profile at the start of daily shot operations.

Maintain the system energy balance and specify the system set up for unique energy balance conditions specified by experimental Principal Investigators.

Qualify the laser for short pulse and picket pulse operations and approve the pulse shape and energy settings for each shot.

Analyze system performance.

Advise during any abnormal laser conditions including directing the suspension of operations if deemed necessary.

Part II
Watch Organization and Watch Relief

2000 Watch Conditions

One of two watch conditions will be stationed whenever the OMEGA Laser Facility (LF) is open for scheduled maintenance or shot operations. Normally, the LF is open from 0400–1730 on Monday and Fridays and from 0400–2030 on Tuesday, Wednesday, and Thursday. Extended shift experimental shot operations are conducted from 0800–2000 on Tuesday, Wednesday, and Thursday (approximately once per month the facility supports shot operations until 2400 on Tuesday, Wednesday, or Thursday), maintenance is conducted on Monday, and maintenance, or laser-system shots, are conducted on Friday (approximately once per month the facility supports experimental shot operations on Friday from 0800 to 1730). The watch conditions are defined as follows:

Watch Condition 1: This watch condition applies during LF maintenance periods, the time prior to shot operations when preoperational checks are being completed, or when shot operations are disrupted for a significant period of time.

Watch Condition 2: This watch condition (Fig. II-1) applies during LF shot operations. It will be stationed when directed by the Shot Director prior to establishing "closed access" for the first shot of a day and remain stationed throughout the period of normal shot operations. This watch condition may be modified by securing watch stations not required for less than a full target shot type (Section 2011).

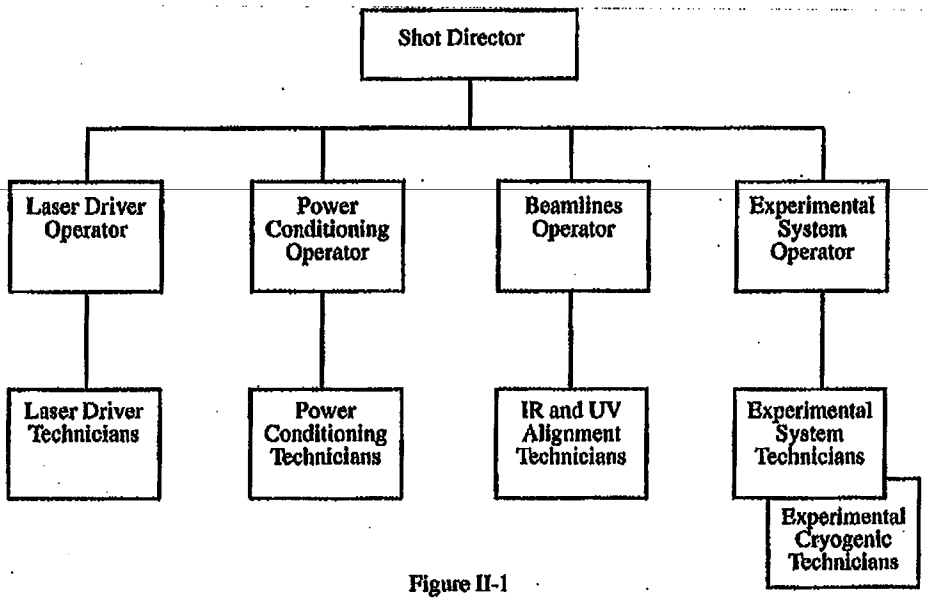

Figure II-1

2001 Shot Director (SD)

The Shot Director is the senior watchstander responsible for the overall operation of the OMEGA Laser Facility during shot operations as well as during maintenance periods. The SD's area of responsibility include the operational control of all laser and target systems, equipment, and ancillary support systems located in the Laser Bay, Target Bay, Capacitor Bays, LaCave, Pulse Generation Room, Driver Electronics Room, Oscillator Room, Target Vacuum Pump Room, Fan Room, and Control Room. Additionally, the SD operates the Facility Interlock Executive and the Shot Executive. The SD will be stationed whenever the Laser Facility is open and will be located within the confines of the Laser Facility at all times when either Watch Condition 1 or 2 is stationed. During stand-down periods, such as meal breaks, the Shot Director may go off-site briefly, as long as he/she has a digital pager. During the time from establishing "closed access" until a shot is completed the SD must be present in the Control Room. The SD reports directly to the Laser Facility Manager. The SD's specific responsibilities include

Direct operational control of the OMEGA Laser Facility and assigned watchstanders in the completion of all laser and target shots. This includes coordinating the completion of pre-operational checks, alignments, and preparations required to fulfill the system or experimental requirements, directing the completion of actual system and experimental shots, and ensuring that the requisite system and experimental shot data is collected.

Operation of the Shot Executive.

Ensuring compliance with all procedural requirements of this LFORM, the Laser Facility Manual, Volume II, Operating Procedures, and other LLE Instructions.

Ensuring compliance with safety procedures including that upon establishing "closed access" the Laser Bay, Target Bay, Capacitor Bays, LaCave, Viewing Gallery, and Neutron Diagnostics Room are cleared of all personnel, as appropriate, prior to executing a shot.

Ensuring that the Laser Facility shutdown checkoff contained in the Laser Facility Manual, Volume II, Operating Procedures, is completed at the conclusion of operations. The short-term checkoff should be completed daily at the end of maintenance or shot operations, and the long-term checkoff should be completed for shutdowns of one week or more.

Control of system status including placing systems and equipment out-of-commission for maintenance and/or testing, maintaining the Equipment Status Log (Section 4003), and approving system/equipment Tagouts/Lockouts (Section 4004).

Control access to the Target Chamber Center to ensure against conflicting requirements.

Controlling access to the Control Room during Watch Condition 2 (Section 4001).

Ensuring that qualified watchstanders (Section 2013) are stationed in accordance with the posted watchbill (Section 2012) prior to conducting shot operations.

Keeping a Shot Director Log (Section 2016).

Conducting prewatch and watch relief briefings as required.

Create, control, and/or modify shot templates, including updating the SRF database entries to reflect the final shot configuration.

Keeping the Laser Facility Manager (LFM), Principal Investigator (PI), applicable Division Directors (Div. Dir.), and others, as appropriate, informed of system status and problems. As a minimum the following will be reported:

Failure to commence shot operations as scheduled (LFM, PI, Eng. and Exp. Div. Dir.).

Failure of a system, equipment, or diagnostic that disrupts operations (LFM, PI, applicable Div. Dir., and applicable Group Leader).

Opening and closing of the Target Chamber (LFM, Laboratory Safety Officer).

Accident or incident that causes personnel injury or significant equipment damage (LFM, applicable Div. Dir., Laboratory Safety Officer, applicable Functional Safety Officer). Additionally, incident investigation and reporting in accordance with LLEINST 6950 should be completed.

2002 Laser Drivers Operator (LDO)

The Laser Drivers Operator is the watchstander responsible for operation of the Laser Driver Executive to ensure that the necessary laser driver control, pulse shaping, and diagnostic functions are provided. He/she has overall responsibility for verifying that the laser driver equipment located in the Oscillator Room, Driver Electronics Room, Pulse Generation Room, Laser Bay, and Target Bay is configured to support planned shot operations. The LDO will be stationed during Watch Condition 2 as required by Section 2011. During the time from establishing "closed access" until a shot is completed he/she must be present in the Control Room. The LDO reports directly to the Shot Director. His/her specific responsibilities include the following:

Operation of the Laser Driver Executive and Pulse Shaping controls.

Keeping the Shot Director informed as to laser driver status and reporting any system abnormalities or failures that affect the ability of the system to shoot.

Coordinating the efforts of the assigned Laser Drivers Technician Watchstanders in the operation of the Laser Driver System.

Reporting his/her relief to the Shot Director.

2003 Power Conditioning Operator (PCO)

The Power Conditioning Operator is the watchstander responsible for operation of the Power Conditioning Executive to ensure that the correct amplifiers are armed and that the charge voltages are consistent with operational limits and beam balance requirements. He/she has overall responsibility for ensuring that the power conditioning equipment is configured to support planned shot operations. The PCO will be stationed during Watch Condition 2 as required by Section 2011. During the time from establishing "closed access" until a shot is completed he/she must be present in the Control Room. The PCO reports directly to the Shot Director. His/her specific responsibilities include the following:

Operation of the Power Conditioning Executive.

Keeping the Shot Director informed as to Power Conditioning status and reporting any system abnormalities or failures that affect the ability of the system to shoot.

Coordinating the efforts of assigned Power Conditioning Technician Watchstanders in the operation of the Power Conditioning System.

Maintain a log of amplifier hardware changes that could affect amplifier energy performance.

Reporting his/her relief to the Shot Director.

2004 Beamlines Operator (BO)

The Beamlines Operator is the watchstander responsible for operation of the Alignment and Beamline Diagnostic Executives to align and control the optical path from the driver

to the target prior to shot operations, assure the functionality of laser diagnostics at shot time, and to assess results between shots. He/she has overall responsibility for ensuring that the laser amplifiers including amplifier cooling and purge systems, alignment sensors, beam splitters, frequency conversion crystals, spatial filter, and beam transport systems are configured to support planned shot operations. The BO will be stationed during Watch Condition 2 as required by Section 2011. During the time from establishing "closed access" until a shot is completed he/she must be present in the Control Room. The BO reports directly to the Shot Director. His/her specific responsibilities include the following:

Operation of the Beamlines Executive.

Keeping the Shot Director informed as to alignment and beamline diagnostic status and reporting any system abnormalities or failures that affect the ability of the system to shoot.

Coordinating the efforts of assigned IR and UV Alignment/Laser Technician Watchstanders in the operation of the alignment, laser amplifier, frequency conversion, or beam transport systems.

Reporting his/her relief to the Shot Director.

2005 Experimental System Operator (ESO)

The Experimental System Operator is the watchstander responsible for operation of the Experimental System Executive to ensure target insertion, viewing, positioning, and diagnostic instrument sequencing as required. He/she has overall responsibility for ensuring that the target vacuum, viewing, positioning, and diagnostic systems are configured to support planned shot operations. The ESO will be stationed during Watch Condition 2 as required by Section 2011. During the time from establishing "closed access" until a shot is completed and data acquisition has concluded he/she must be present in the Control Room. The ESO reports directly to the Shot Director. His/her specific responsibilities include the following:

Operation of the Experimental System Executive, vacuum and cryogenic target controls, and Target Existence Detection (TED) controls.

Keeping the Shot Director informed as to target and diagnostic system status and reporting any system abnormalities or failures that affect the ability of the system to shoot.

Coordinating the efforts of assigned Experimental System Technician Watchstanders in the operation of the target vacuum, positioning, and diagnostic systems including film and neutron activation sample retrieval and developing/counting.

Coordinating the efforts of assigned Experimental Cryogenic Technician Watchstanders in the operation of the MCTC and Lower Pylon systems in preparing for and recovering from cryogenic shots.

Coordinating access to the Target Bay and support of authorized personnel from outside organizations.

Supervise the secondary ESO when assigned to ensure a distinct division of responsibilities is assigned and completed.

In conjunction with the Shot Director, control access to the Target Chamber Center to ensure against conflicting requirements.

Update SRF database entries to reflect the final shot configuration of diagnostics.

Reporting his/her relief to the Shot Director.

2006 Laser Drivers Technician (LDT)

The Laser Drivers Technician is the watchstander responsible for local monitoring/ adjustment of the driver line. Additionally, he/she is available for any corrective maintenance that may be required. The LDT will be stationed during Watch Condition 2 as required by Section 2011 and will normally be present in the PGR/DER, Oscillator Room, or Control Room. The LDT reports to the Shot Director via the Laser Drivers Operator. His/her specific responsibilities include the following:

Local monitoring and operation of the master oscillator, pulse shaping, pulse generation and the SSD, main backlighter, and fiducial lasers.

Keeping the Laser Drivers Operator informed as to driver line status and reporting any system abnormalities or failures that affect the ability of the system to shoot.

Reporting his/her relief to the Shot Director.

2007 Power Conditioning Technician (PCT)

The Power Conditioning Technician is the watchstander responsible for preoperational checks and required corrective maintenance of the Power Conditioning System during shot operations. The PCT will be stationed during Watch Condition 2 as required by Section 2011 and will normally be present in the OMEGA Laser Facility. He/she will keep the PCO informed as to his/her whereabouts. The PCT reports to the Shot Director via the Power Conditioning Operator. His/her specific responsibilities include the following:

Completing preoperational checks and maintenance of the Power Conditioning System.

Keeping the Power Conditioning Operator informed as to power conditioning status and reporting any system abnormalities or failures that affect the ability of the system to shoot.

Safing of power conditioning units as required for laser amplifier lamp replacement or maintenance.

Reporting his/her relief to the Shot Director.

2008 IR and UV Alignment/Laser Technicians (IR-ALT & UV-ALT)

The IR Alignment/Laser Technician is the watchstander responsible for laser diagnostic set-up and supervision of Laser Bay activities during shot operations. The UV Alignment/Laser Technician is the watchstander responsible for alignment of the optical path from the F-ASP to target, operation of the laser diagnostics, and frequency conversion crystals during shot operations. Additionally, they are both responsible for corrective maintenance of the alignment, laser amplifier, frequency conversion, beam transport, and laser diagnostic systems during shot operations. The IR and UV ALT's will be stationed during Watch Condition 2 as required by Section 2011 and will normally be present in the vicinity of the Control Room. They will keep the BO informed as to their whereabouts. The IR and UV ALT's report to the Shot Director via the Beamline Operator. Their specific responsibilities include the following:

Completing preoperational optical alignment and other amplifier, frequency conversion, beam transport, laser diagnostic, and ancillary system startup/checkout prior to shot operations.

Keeping the Beamline Operator informed as to beamline status and reporting any system abnormalities or failures that affect the ability of the system to shoot.

Reporting his/her relief to the Shot Director.

2009 Experimental System Technician (EST)

The Experimental System Technician is the watchstander responsible for preparation of the target vacuum, insertion, viewing, positioning, and target diagnostic systems prior to shots, retrieval of film and neutron activation specimens and target diagnostic change outs between shots. The EST will be stationed during Watch Condition 2 as required by Section 2011 and will normally be present in the vicinity of the Control Room or Dark Room during "closed access" and the Target Bay or LaCave during non-closed-access periods. He/she will keep the ESO informed as to his/her whereabouts. The EST reports to the Shot Director via the ESO. His/her responsibilities include the following:

Completing preoperational checks of the target vacuum, positioning, and target diagnostic systems prior to shot operations.

Retrieval of film, knock-on detectors, and neutron activation specimens and insertion of warm targets between shot operations.

Keeping the Experimental System Operator informed as to target vacuum, positioning, or target diagnostic system abnormalities or failures that affect the ability of the system to shoot.

Preparation and securing of the Target Bay equipment that is specific to cryogenic shots including the Upper Pylon/Linear Induction Motor (LIM), the Cryo Target Detector (CTD) and the Shroud Viewing System (SVS).

Escort authorized personnel from outside organizations while in the Target Bay in support of shot operations.

Reporting his/her relief to the Shot Director.

2009A Photographic Technician (PT)

The Photographic Technician is the individual responsible for the development of all film associated with laser and target operations. The photographic technician will be stationed during Watch Condition 2 and will normally be present in the LaCave Darkroom. He/she will keep the ESO informed of his/her whereabouts. His/her specific responsibilities include the following:

Operation of JOBO film processors to develop all film associated with laser and target operations.

Drying, labeling, and storing/filing of processed film.

Loading film packs.

Maintaining film and development chemical inventories.

2009B Experimental Cryogenic Technician (ECT)

The Experimental Cryogenic Technician is the watchstander responsible for connection of the moving cryostat transport cart (MCTC) to the Lower Pylon and its operation in support of OMEGA cryogenic shot operations. The ECT will be stationed during Watch Condition 2 as required by Sec. 2011 and will remain in the vicinity of LaCave during "closed access". He/she will keep the ESO informed as to his/her whereabouts. The ECT reports to the Shot Director via the ESO. His/her responsibilities include the following:

Preparation, operation, and securing of the Lower Pylon including the chain locker,

Docking of the MCTC at the Lower Pylon and operation of the joined subsystems through the shot cycle,

Disconnecting the MCTC and securing the Lower Pylon after the target is expended,

Keeping the ESO informed as to the status of the equipment,

Maintaining appropriate liaison with the Target Fabrication CTHS group, and

Reporting his/her relief to the Shot Director.

2010 Condition 1 Watch Organization—Shutdown Maintenance Operations

The following watchstanders will be stationed during Watch Condition 1:

Shot Director

Others considered appropriate during special test/maintenance evolutions

2011 Condition 2 Watch Organization—Shot Operations

The following watchstanders will be stationed during Watch Condition 2:

Watchstation	Shot Type[1]						
	1	2	3	4	5	6	7
Shot Director	X	X	X	X	X	X	X
Laser Drivers Operator	X		X	X	X	X	X
Power Conditioning Operator	X[2]	X[2]	X[2]	X[2]	X	X	X
Beamlines Operator		X	X	X	X	X	X
Experimental System Operator						X	X
Laser Drivers Technician	X		X	X	X	X	X
Power Conditioning Technician	X[2]	X	X	X	X	X	X
IR Alignment/Laser Technician	X	X	X	X	X	X	X
UV Alignment/Laser Technician					X	X	X
Experimental System Technician						X	X
Second Experimental System Technician (if required)						X	X
Photographic Technician						X	X
Experimental Cryogenic Technician						X[3]	X[3]
Second Experimental Cryogenic Technician (if required)						X[3]	X[3]

NOTES:

1. "X" denotes watch stations that must be manned. Shot types are defined as follows:
   1. Driver
   2. Nonpropagating
   3. Injection near-field
   4. Beamline, propagating to D
   5. Beamline, Propagating to F or small-signal gain shots
   6. Target, low yield
   7. Target, high yield
2. The SD may operate the Power Conditioning System for up to 5 head driver and single beam D-NF's in lieu of stationing a PCO and PCT.
3. Experimental Cryogenic Technicians (ECT's) are required only during shots that involve the CTHS.

2012 Watchbill

For each day that the Laser Facility is open a watchbill will be prepared by that person designated by the Laser Facility Manager for watchbill administration. This watchbill must be approved by the Laser Facility Manager and posted in the Control Room. Any substitutions to this approved watchbill must be approved by the Shot Director. A sample watchbill format (Fig. II-2) is shown on p. II-12.

2013 List of Qualified Watchstanders

All personnel must complete the initial watch station qualification specified in Part III of this manual. Only those who have completed the requisite qualification and have maintained watchstanding proficiency may stand watch and be assigned on the Laser Facility watchbill. To ensure that only qualified personnel are assigned to watches, a list of currently qualified watchstanders will be maintained accessible to the Shot Director. The Laser Facility Manager or the person designated by him/her will maintain this list of qualified watchstanders. The qualified watchstander list will be maintained by watch station and will list the name of those qualified and his/her date of qualification.

2014 Watch Relief and Preshot Briefing

Prior to the commencement of each day or shift of shot operations the Shot Director will conduct a briefing of key personnel. As a minimum the Control Room Operators and the Principal Investigator, if appropriate, will attend this briefing. As a minimum the following will be covered in this briefing:

Status of completion of alignment, preoperational checks, and readiness of the system.

Scheduled shot requirements including driver, target, beam, diagnostic, and data.

Review of problems experienced during the previous shift.

Review of the Laser Facility Manager Day Orders.

Watch relief, if required because of two shift operations or to accommodate individual watchstander requirements, will be conducted in an orderly and controlled manner. Control Room watchstanders must have the Shot Director's permission to be relieved and will not be relieved in the middle of an individual shot sequence. All personnel who are relieved of their duties will report their relief to the Shot Director.

2015 Laser Facility Manager Day Orders

The Laser Facility Manager will prepare written directions for Laser Facility operations on a daily basis in a permanent record format that is made available to the Shot Director prior to each day's operations. The following exemplify material to be included in these day orders:

Laser and experimental target shot plan for the day.

Preoperational and alignment checks required prior to conducting shot operations.

Significant testing or maintenance actions scheduled.

Problems or special circumstances that warrant particular attention.

Administrative items of general interest to facility operators.

The Day Orders will be read on a daily basis by all watchstanders prior to assuming watch.

2016 Shot Director Log

The Shot Director will keep a chronological handwritten log to document the operation of the Laser Facility during his/her watch. Each entry will be preceded by the time, and the log shall indicate the identity of the person standing each watch shift and the times of relief and facility securing. The following are required entries in this log:

Stationing and securing of Watch Condition 2.

Commencement and completion of a particular shot series/experiment (e.g., ISE, RT1, SSP, etc.).

Specific target shots will be logged in the following format: Shot number, Shot type, RID#, number of beams to target, total energy on target, PCU failures,

e.g., "8051, 7, 2100, 60, 28.6 kJ, F41 prefire"

Significant problems or accomplishments.

Opening and closing of the Target Chamber.

Placing in or out of commission significant systems that affect the ability to perform shot operations.

An incident that results in personnel injury or significant material damage.

2017 Watch Standing Proficiency

Watchstanders must stand at least two watches per quarter to maintain proficiency on individual watchstations. Personnel who do not stand at least two watches per quarter will be removed from the list of qualified watchstanders and may not stand watch until qualification is recertified.

OMEGA Laser Facility Watchbill

Date: _____
(give inclusive date of the Monday through Friday period)

On Call (1730-0830)

Watch Station	Monday	Tuesday	Wednesday	Thursday	Friday
Shot Director					

Prewatch system startup assignments (Beamline Ops report at 0400, Drivers report at 0700)

Assignment	Monday	Tuesday	Wednesday	Thursday	Friday
Driver S/U					
Alignment Preops					

Watchstanders (0900-1730; Report at 0830)

Watch Station	Monday	Tuesday	Wednesday	Thursday	Friday
Shot Director					
LDO					
PCO					
BO (AM)					
BO (PM)					
ESO					
LDT					
PCT 1					
PCT 2					
IR-ALT 1					
IR-ALT 2					
UV-ALT (AM)					
UV-ALT (PM)					
EST 1					
EST 2					
ECT 1					
ECT 2					
PT					

0900 Watch Briefing

Approved: _____ / _____
(Laser Facility Manager) (Date)

Figure II-2

Part III
Watchstander Training and Qualification

3000 Watchstander Training and Qualification Administration

All personnel assigned to stand watch in the OMEGA Laser Facility must complete a formal documented qualification process that consists of the following:

Completion of prerequisite training and qualifications.

Demonstration of knowledge of Laser Facility organization and administrative procedures by satisfactorily completing an oral checkout from a qualified person.

Demonstration of technical system, subsystem, and equipment knowledge and associated applied engineering principals by satisfactorily completing an oral checkout from a qualified person.

Standing training watches under instruction of a qualified watchstander.

Completing certain operational procedural requirements (practical factors) under the supervision of a qualified watchstander.

Completing an oral examination by the appropriate Group Leader, or his/her designate, after all other qualification card requirements are completed.

Personnel who have lost watchstanding proficiency must complete a recertification process that consists of the following:

Reading any changes to the operating procedures issue since last standing watch.

Reading the Laser Facility Manager's Day Orders for the last month.

Standing one watch of at least four hours under instruction of a qualified and proficient watchstander.

Completing an oral examination by the appropriate Group Leader after completing the above.

All personnel assigned to photographic development duties must have completed the applicable qualification requirements. A listing of qualified Photographic Technicians will be posted at the entrance to the LaCave darkroom.

Personnel will be assigned to qualify on specific watch stations by their respective Group Leader. While personnel from any Division/Group may qualify on any watch station, and are encouraged to do so, normally watchstanders come from specific Divisional Groups as follows:

Laser Engineering Group
- Shot Director
- Laser Drivers Operator
- Beamlines Operator
- Laser Drivers Technician
- IR Alignment/Laser Technician
- UV Alignment/Laser Technician

Electronics Engineering Group
- Power Conditioning Operator
- Power Conditioning Technician

Experimental Operations Group
- Experimental System Operator
- Experimental System Technician
- Photographic Technician
- Experimental Cryogenic Technician

Cryogenics and Tritium Facility Group
- Experimental Cryogenic Technician

Personnel who are qualified to sign qualification card requirements are as follows:

Knowledge Requirements
- Personnel qualified on the watch station
- Cognizant Group Leader
- Cognizant lead system expert/subgroup supervisor
- Qualified Shot Director
- Other personnel designated in writing by the Laser Facility Manager

Watches and Practical Factors

Personnel qualified on the watch station
Qualified Shot Director
Other personnel designated in writing by the Laser Facility Manager

Qualification Certification

Laser Facility Manager
Shot Director
Cryogenics and Tritium Facility Manager
Experimental Cryogenic Technician
Laser Engineering Group Leader
Laser Drivers Operator
Beamlines Operator
Laser Drivers Technician
IR Alignment/Laser Technician
UV Alignment/Laser Technician
Power Conditioning Operator
Power Conditioning Technician
Experimental Operations Group Leader
Experimental System Operator
Experimental System Technician
LLE Radiation Safety Officer
Radiation Worker
LLE Imaging Specialist
Photographic Technician

Once an individual completes a particular watch qualification, his/her name will be placed on the list of qualified watchstanders (2013), and the completed qualification card will be filed as permanent record.

Personnel who fail to stand at least two watches per quarter will be removed from the list of qualified watchstanders. When qualification is recertified their names will be placed on the qualified watchstanders list and the completed recertification card will be filed as a permanent record.

3001 Shot Director Qualification Card

Name _____

Prerequisites: Research Engineer or Sr. Laboratory Engineer
Laser, Chemical, and Electrical Orientation Training
Radiation Worker Qualification

Knowledge Requirements: Demonstrate a knowledge of the following by satisfactorily completing an oral examination by a qualified individual:

REQUIREMENT	QUALIFIED SIGNATURE/DATE
1. Watch conditions, watch relief, procedural compliance, access, maintenance, tagout, safety, incidents (LFORM, LLE INST 6950)	_____ / _____
2. Laser Drivers (Vol. I, Chapter 2)	_____ / _____
3. Laser Amplifiers and Staging (Vol. I, Chapter 3)	_____ / _____
4. Power Conditioning (Vol. I, Chapter 4)	_____ / _____
5. Optomechanical System (Vol. I, Chapter 5)	_____ / _____
6. Laser Diagnostics (Vol. I, Chapter 6)	_____ / _____
7. Experimental System (Vol. I, Chapter 7)	_____ / _____
8. Target Diagnostics (Vol. I, Chapter 9)	_____ / _____
9. Facility & Safety Interlocks (Vol. I, Chapter 10)	_____ / _____
10. Operating Procedures SO1 and SS1	_____ / _____

Watch Standing Requirements: Stand the following watches under instruction of a qualified operator during Condition 2 shot operations unless otherwise indicated:

REQUIREMENT	QUALIFIED SIGNATURE/DATE
1. Laser Drivers Operator (two 2-hour watches)	_____ / _____
	_____ / _____
2. Power Conditioning Operator (two 2-hour watches)	_____ / _____
	_____ / _____
3. Beamlines Operator (two 2-hour watches)	_____ / _____
	_____ / _____
4. Experimental System Operator (two 2-hour watches)	_____ / _____
	_____ / _____

5. IR Alignment Technician Watch (one 2-hour watch) _____ / _____
6. UV Alignment Technician Watch (one 2-hour watch) _____ / _____
7. Experimental System Tech. Watch (one 2-hour watch) _____ / _____
8. Shot Director (five 6-hour watches, including one morning startup and one evening shutdown) _____ / _____
9. Shot Director (two 8-hour watches) during Watch Condition 1 _____ / _____

Practical Factors: Satisfactorily complete the following practical factor under the supervision of a qualified operator:

REQUIREMENT	QUALIFIED SIGNATURE/DATE
1. One target shot as Beamlines Operator	_____ / _____
2. One target shot as Experimental System Operator	_____ / _____
3. One type 1, 2, or 3 shot as Shot Director	_____ / _____
4. One type 4 or 5 shot as Shot Director	_____ / _____
5. One type 6 shot as Shot Director	_____ / _____
6. One type 7 shot as Shot Director	_____ / _____
7. One cryogenic target shot as Shot Director	_____ / _____
8. Execute one series of SSG Shots	_____ / _____
9. Laser driver startup	_____ / _____
10. One IR system optical alignment	_____ / _____
11. One UV system optical alignment	_____ / _____
12. One opening and close out of the Target Chamber	_____ / _____
13. Transfer a target into the Target Chamber and position it	_____ / _____
14. One cycling of a TIM as EST	_____ / _____

Qualification Certification: Satisfactorily complete a comprehensive oral examination covering all the knowledge and practical requirements of this qualification.

EXAMINATION AND CERTIFICATION _____ / _____

(Laser Facility Manager)

3002 Laser Drivers Operator Qualification Card

Name _____

Prerequisites: Laser Drivers Technician Qualification

Knowledge Requirements: Demonstrate a knowledge of the following by satisfactorily completing an oral examination by a qualified individual:

REQUIREMENT	QUALIFIED SIGNATURE/DATE
1. Watch conditions, watch relief, procedural compliance, access, maintenance, tagout, safety, incidents (LFORM, LLB INST 6950)	_____ / _____
2. Laser Drivers (Vol. I, Chapter 2)	_____ / _____
3. Facility and Safety Interlocks (Vol. I, Chapter 10)	
4. Operating Procedures SO4 and SS4	_____ / _____

Watch Standing Requirements: Stand the following watches under instruction of a qualified operator during Condition 2 shot operations unless otherwise indicated:

REQUIREMENT	QUALIFIED SIGNATURE/DATE
1. Laser Drivers Operator (four 4-hour watches, including one morning startup and one evening shutdown)	_____ / _____
	_____ / _____
	_____ / _____
	_____ / _____

Practical Factors: Satisfactorily complete the following practical factor under the supervision of a qualified operator:

REQUIREMENT	QUALIFIED SIGNATURE/DATE
1. Four shots as Laser Drivers Operator	_____ / _____
	_____ / _____
	_____ / _____
	_____ / _____

Qualification Certification: Satisfactorily complete a comprehensive oral examination covering all the knowledge and practical requirements of this qualification.

EXAMINATION AND CERTIFICATION _____ / _____
(Laser Engineering Group Leader)

3003 Power Conditioning Operator Qualification Card

Name _____

Prerequisites: Laser, Chemical, and Electrical Orientation Training

Knowledge Requirements: Demonstrate a knowledge of the following by satisfactorily completing an oral examination by a qualified individual:

REQUIREMENT	QUALIFIED SIGNATURE/DATE
1. Watch conditions, watch relief, procedural compliance, access, maintenance, tagout, safety, incidents (LFORM, LLE INST 6950)	_____ / _____
2. Power Conditioning (Vol. I, Chapter 4)	_____ / _____
3. Facility & Safety Interlocks (Vol. I, Chapter 10)	_____ / _____
4. Operating Procedures SO2 and SS2	_____ / _____

Watch Standing Requirements: Stand the following watches under instruction of a qualified operator during Condition 2 shot operations unless otherwise indicated:

REQUIREMENT	QUALIFIED SIGNATURE/DATE
1. Power Conditioning Panel Operator (six 4-hour watches,	_____ / _____
including one morning startup and one evening shutdown)	_____ / _____
	_____ / _____
	_____ / _____
	_____ / _____
	_____ / _____
2. Power Conditioning Technician (one 4-hour watch)	_____ / _____
3. IR Alignment Technician (one r-hour watch)	_____ / _____

Practical Factors: Satisfactorily complete the following practical factor under the supervision of a qualified operator:

REQUIREMENT	QUALIFIED SIGNATURE/DATE
1. Two type 1, 2, or 3 shots as Power Conditioning Operator	_____ / _____
	_____ / _____
2. Two 40 - 60 beam shots as Power Conditioning Operator	_____ / _____
	_____ / _____

3. Template drills (1 each with LFM, System Eng, any SD) _____ /

_____ /

_____ /

Qualification Certification: Satisfactorily complete a comprehensive oral examination covering all the knowledge and practical requirements of this qualification

EXAMINATION AND CERTIFICATION _____ /
(Laser Engineering Group Leader)

3004 Beamlines Operator Qualification Card

Name _____

Prerequisites: IR and UV Alignment/Laser Technician Qualification

Knowledge Requirements: Demonstrate a knowledge of the following by satisfactorily completing an oral examination by a qualified individual:

REQUIREMENT	QUALIFIED SIGNATURE/DATE
1. Watch conditions, watch relief, procedural compliance, access, maintenance, tagout, safety, incidents (LFORM, LLE INST 6950)	_____ / _____
2. Laser Amplifiers and Staging (Vol. I, Chapter 3)	_____ / _____
3. Optomechanical System (Vol. I, Chapter 5)	_____ / _____
4. Laser Diagnostics (Vol. I, Chapter 6)	_____ / _____
5. Facility & Safety Interlocks (Vol. I, Chapter 10)	_____ / _____
6. Operating Procedures SO3 and SS3	_____ / _____

Watch Standing Requirements: Stand the following watches under instruction of a qualified operator during Condition 2 shot operations unless otherwise indicated:

REQUIREMENT	QUALIFIED SIGNATURE/DATE
1. Beamlines Operator (four 4-hour watches, including	_____ / _____
one morning startup and one evening shutdown)	_____ / _____
	_____ / _____
	_____ / _____

Practical Factors: Satisfactorily complete the following practical factor under the supervision of a qualified operator:

REQUIREMENT	QUALIFIED SIGNATURE/DATE
1. One type 1, 2, or 3 shot as Beamlines Operator	_____ / _____
2. One type 4 or 5 shot as Beamlines Operator	_____ / _____
3. One type 6 or 7 shot as Beamlines Operator	_____ / _____
4. Two shots on a 1-hr. shot cycle as Beamlines Operator	_____ / _____
5. Inject Main or SSD driver beams including	_____ / _____
an adjustment (twice)	_____ / _____

6. Inject Backlighter driver (twice) _____ /

_____ /

Qualification Certification: Satisfactorily complete a comprehensive oral examination covering all the knowledge and practical requirements of this qualification

EXAMINATION AND CERTIFICATION _____ /
(Laser Engineering Group Leader)

3005 Experimental System Operator Qualification Card

Name _____

Prerequisites: Experimental System Technician Qualification

Knowledge Requirements: Demonstrate a knowledge of the following by satisfactorily completing an oral examination by a qualified individual:

REQUIREMENT	QUALIFIED SIGNATURE/DATE
1. Watch conditions, watch relief, procedural compliance, access, maintenance, tagout, safety, incidents (LFORM, LLE INST 6950)	_____ / _____
2. Experimental System (Vol. I, Chapter 7)	_____ / _____
3. Target Diagnostics (Vol. I, Chapter 9)	_____ / _____
4. Facility & Safety Interlocks (Vol. I, Chapter 10)	_____ / _____
5. Operating Procedures SO5 and SS5	_____ / _____

Watch Standing Requirements: Stand the following watches under instruction of a qualified operator during Condition 2 shot operations unless otherwise indicated:

REQUIREMENT	QUALIFIED SIGNATURE/DATE
1. Experimental System Operator (four 4-hour watches, including one morning startup and one evening shutdown)	_____ / _____
	_____ / _____
	_____ / _____
	_____ / _____

Practical Factors: Satisfactorily complete the following practical factor under the supervision of a qualified operator:

REQUIREMENT	QUALIFIED SIGNATURE/DATE
1. Start-up Experimental Executive software	_____ / _____
2. Four type 6 or 7 shots as Experimental System Operator (At least two shall be on a 1-hour shot cycle, and one shall be a cryogenic shot.)	_____ / _____
	_____ / _____
	_____ / _____
	_____ / _____
3. Align a target	_____ / _____
4. Demonstrate XRFC timing calculation, tracking, and verification	_____ / _____

5. Pump down the Target Chamber _____/_____

6. Regenerate the cryo pump _____/_____

Qualification Certification: Satisfactorily complete a comprehensive oral examination covering all the knowledge and practical requirements of this qualification

EXAMINATION AND CERTIFICATION _____/_____
(Experimental Operations Group Leader)

3006 Laser Drivers Technician Qualification Card

Name _____

Prerequisites: Laser, Chemical, and Electrical Orientation Training
Photographic Technician Qualification

Knowledge Requirements: Demonstrate a knowledge of the following by satisfactorily completing an oral examination by a qualified individual:

REQUIREMENT	QUALIFIED SIGNATURE/DATE
1. Watch conditions, watch relief, procedural compliance, access, maintenance, tagout, safety, incidents (LFORM, LLE INST 6950)	_____ / _____
2. Laser Drivers (Vol. I, Chapter 2)	_____ / _____
3. Facility and Safety Interlocks (Vol. I, Chap. 10)	_____ / _____
4. Operating Procedures SS4	_____ / _____

Watch Standing Requirements: Stand the following watches under instruction of a qualified operator during Condition 2 shot operations unless otherwise indicated:

REQUIREMENT	QUALIFIED SIGNATURE/DATE
1. Laser Drivers Technician (four 4-hour watches, including	_____ / _____
one morning startup and one evening shutdown)	_____ / _____
	_____ / _____
	_____ / _____

Practical Factors: Satisfactorily complete the following practical factor under the supervision of a qualified operator:

REQUIREMENT	QUALIFIED SIGNATURE/DATE
1. Laser Driver startup including the Oscillator, PGR, & DER	_____ / _____
(1 each for Main, SSD, BL)	_____ / _____
	_____ / _____

2. Laser Driver alignment from PGR to A-split _____ /
   (1 each for Main, SSD, BL) _____ /
   _____ /
3. Leafscan a laser driver injection NF _____ /
4. Change a regen lamp _____ /
5. Change pulse shapes _____ /
6. Re-time LARA Pockels cells (any driver) _____ /
7. Diagnose a regen problem _____ /
8. Demonstrate proficiency with all roving driver oscilloscopes _____ /

Qualification Certification: Satisfactorily complete a comprehensive oral examination covering all the knowledge and practical requirements of this qualification.

EXAMINATION AND CERTIFICATION _____ /
(Laser Engineering Group Leader)

3007 Power Conditioning Technician Qualification Card

Name _____

Prerequisites: Laser, Chemical, and Electrical Orientation Training

Knowledge Requirements: Demonstrate a knowledge of the following by satisfactorily completing an oral examination by a qualified individual:

REQUIREMENT	QUALIFIED SIGNATURE/DATE
1. Watch conditions, watch relief, procedural compliance, access, maintenance, tagout, safety, incidents (LFORM, LLE INST 6950)	_____ / _____
2. Power Conditioning (Vol. I, Chapter 4)	_____ / _____
3. Facility & Safety Interlocks (Vol. I, Chapter 10)	_____ / _____

Watch Standing Requirements: Stand the following watches under instruction of a qualified operator during Condition 2 shot operations unless otherwise indicated:

REQUIREMENT	QUALIFIED SIGNATURE/DATE
1. Power Conditioning Technician (eight-hour watches, including one morning startup and one evening shutdown)	_____ / _____
	_____ / _____
	_____ / _____
	_____ / _____
	_____ / _____
	_____ / _____
	_____ / _____
	_____ / _____
	_____ / _____

Practical Factors: Satisfactorily complete the following practical factor under the supervision of a qualified operator:

REQUIREMENT	QUALIFIED SIGNATURE/DATE
1. Two Power Conditioning Preoperational Checkoffs	_____ / _____
	_____ / _____
2. Reset the 750 kVA	_____ / _____
3. Power Conditioning Shutdown	_____ / _____

Qualification Certification: Satisfactorily complete a comprehensive oral examination covering all the knowledge and practical requirements of this qualification.

EXAMINATION AND CERTIFICATION

_____
(Laser Engineering Group Leader)

3008A IR Alignment/Laser Technician Qualification Card

Name _____

Prerequisites: Laser, Chemical, and Electrical Orientation Training

Knowledge Requirements: Demonstrate a knowledge of the following by satisfactorily completing an oral examination by a qualified individual:

REQUIREMENT	QUALIFIED SIGNATURE/DATE
1. Watch conditions, watch relief, procedural compliance, access, maintenance, tagout, safety, incidents (LFORM, LLE INST 6950)	_____ / _____
2. Laser Amplifiers and Staging (Vol. I, Chapter 3)	_____ / _____
3. Optomechanical System (Vol. I, Chapter 5)	_____ / _____
4. Laser Diagnostics (Vol. I, Chapter 6)	_____ / _____
5. Facility & Safety Interlocks (Vol. I, Chapter 10)	_____ / _____
6. Operating Procedures SO3 and SS3	_____ / _____

Watch Standing Requirements: Stand the following watches under instruction of a qualified operator during Condition 2 shot operations unless otherwise indicated:

REQUIREMENT	QUALIFIED SIGNATURE/DATE
1. IR Alignment/Laser Technician (three 4-hour watches,	_____ / _____
including one morning startup and one evening shutdown)	_____ / _____
	_____ / _____

Practical Factors: Satisfactorily complete the following practical factor under the supervision of a qualified operator:

REQUIREMENT	QUALIFIED SIGNATURE/DATE
1. Start up the IRAT Laser	_____ / _____
2. Shut down the IRAT Laser	_____ / _____
3. Complete 6 hours of system alignment checkout, including IRAT injection; rod, pinhole, and leg alignment; beamline alignment; and blind pointing	_____ / _____
4. Set up rover calorimeter including cabling (twice)	_____ / _____
	_____ / _____
5. Check 30 beamline near fields with viewer (twice)	_____ / _____

6. Complete one HED burn paper set up and retrieval _____/_____
7. Cycle all rod AFC's _____/_____
8. Analyze/replace one set of B-split retro burn paper _____/_____
9. Test/replace one neuron module _____/_____
10. Replace one 64-mm or 90-mm brick assembly _____/_____
11. Replace one 15-cm brick assembly _____/_____
12. Replace one 20-cm brick assembly _____/_____
13. Execute a Stage-D near field on film _____/_____
14. Execute a Stage-A near field on film _____/_____

Qualification Certification: Satisfactorily complete a comprehensive oral examination covering all the knowledge and practical requirements of this qualification.

EXAMINATION AND CERTIFICATION _____/_____
(Laser Engineering Group Leader)

3008B UV Alignment/Laser Technician Qualification Card

Name _____

Prerequisites: Laser, Chemical, and Electrical Orientation Training

Knowledge Requirements: Demonstrate a knowledge of the following by satisfactorily completing an oral examination by a qualified individual:

REQUIREMENT	QUALIFIED SIGNATURE/DATE
1. Watch conditions, watch relief, procedural compliance, access, maintenance, tagout, safety, incidents (LFORM, LLE INST 6950)	_____ /
2. Laser Amplifiers and Staging (Vol. I, Chapter 3)	_____ /
3. Optomechanical System (Vol. I, Chapter 5)	_____ /
4. Laser Diagnostics (Vol. I, Chapter 6)	_____ /
5. Facility & Safety Interlocks (Vol. I, Chapter 10)	_____ /
6. Operating Procedures SO3 and SS3	_____ /
7. Demonstrate understanding of entire PreOps Checklist	_____ /
8. Demonstrate understanding of entire Shutdown Checklist	_____ /

Watch Standing Requirements: Stand the following watches under instruction of a qualified operator during Condition 2 shot operations unless otherwise indicated:

REQUIREMENT	QUALIFIED SIGNATURE/DATE
1. UV Alignment/Laser Technician (three 4-hour watches,	_____ /
including one morning startup and one evening shutdown)	_____ /
	_____ /

Practical Factors: Satisfactorily complete the following practical factor under the supervision of a qualified operator:

REQUIREMENT	QUALIFIED SIGNATURE/DATE
1. Complete UVAT orientation	_____ /
2. UV alignment GUI Startup/Shutdown	_____ /
3. Inject PMA into 10 F-ASP's	_____ /
4. Target 10 UV beams with DPP's	_____ /
5. Target 10 UV beams without DPP's/with DPR's	_____ /
6. Target 10 UV beams without DPP's/without DPR's	_____ /

7. Start up FCC software and move 60 FCC's (twice) _____/_____
_____/_____
8. Start up and shut down calorimeter software (twice) _____/_____
_____/_____
9. Start up and shut down HBD software (twice) _____/_____
_____/_____
10. Configure UV system and run macros (three times) _____/_____
_____/_____
_____/_____
11. Conduct HBD alignment checks (twice) _____/_____
_____/_____
12. Complete one HBD realignment _____/_____
13. Install one beam's target and end mirror covers _____/_____
14. Remove one beam's target and end mirror covers _____/_____
15. Start up UVAT I and UVAT II laser (twice) _____/_____
_____/_____
16. Shut down UVAT I and UVAT II laser (twice) _____/_____
_____/_____
17. Demonstrate operation of the HTS _____/_____
18. P510 software startup/shutdown _____/_____
19. OMEGA Data Viewer (ODV) software orientation _____/_____
20. Startup/shutdown of PMA software and conduct
a PMA PLC reboot _____/_____
21. Configure UVAT for green beam operations _____/_____

Qualification Certification: Satisfactorily complete a comprehensive oral examination covering all the knowledge and practical requirements of this qualification.

EXAMINATION AND CERTIFICATION _____/_____
(Laser Engineering Group Leader)

3009 Experimental SystemTechnician Qualification Card

Name _____

Prerequisites: Laser, Chemical, and Electrical Orientation Training
Radiation Worker Qualification

Knowledge Requirements: Demonstrate a knowledge of the following by satisfactorily completing an oral examination by a qualified individual:

REQUIREMENT	QUALIFIED SIGNATURE/DATE
1. Watch conditions, watch relief, procedural compliance, access, maintenance, tagout, safety, incidents (LFORM, LLE INST 6950)	_____ /
2. Experimental System (Vol. I, Chapter 7)	_____ /
3. Target Diagnostics (Vol. I, Chapter 9)	_____ /
4. Facility & Safety Interlocks (Vol. I, Chapter 10)	_____ /
5. Operating Procedures SS5 and SO6	_____ /

Watch Standing Requirements: Stand the following watches under instruction of a qualified operator during Condition 2 shot operations unless otherwise indicated:

REQUIREMENT	QUALIFIED SIGNATURE/DATE
1. Experimental SystemTechnician (four 4-hour watches,	_____ /
including one morning startup and one evening shutdown)	_____ /
	_____ /
	_____ /

Practical Factors: Satisfactorily complete the following practical factor under the supervision of a qualified operator:

REQUIREMENT	QUALIFIED SIGNATURE/DATE
1. Open and close out of the Target Chamber	_____ /
2. Load and recover of one diagnostic film pack	_____ /
3. Load one neutron activation specimen	_____ /
4. Configure TIM-based diagnostic from build sheet	_____ /
5. Target Chamber pump down from atmospheric pressure	_____ /
6. Transfer a target into the Target Chamber and position it	_____ /
7. Complete a Target Bay sweep	_____ /
8. Complete an external bay sweep	_____ /

9. Complete the cycling of a TIM loaded with a diagnostic _____/_____

10. Activate and subsequently secure the LIM and the CTD shutters. Verify correct operation of the SVS. _____/_____

Qualification Certification: Satisfactorily complete a comprehensive oral examination covering all the knowledge and practical requirements of this qualification.

EXAMINATION AND CERTIFICATION _____/_____
(Experimental Operations Group Leader)

3009A Photographic Technician Qualification Card

Name _____

Prerequisites: Attend the LLE Darkroom Technician training lecture(s); read the Darkroom Manual and the JOBO Operating Instruction manuals *AutoLab ATL2* and *AutoLab ATL-2000.*

Knowledge Requirements: Demonstrate a knowledge of the following by satisfactorily completing an oral examination by a qualified individual:

REQUIREMENT	QUALIFIED SIGNATURE/DATE
1. Location, storage, and handling of film	_____ / _____
2. Location, storage, and handling of chemistry	_____ / _____
3. Location, storage, and handling of film tanks	_____ / _____
4. General use of both darkrooms (lighting, etc.)	_____ / _____
5. JOBO film processor starting, running, shutdown	_____ / _____
6. Identifying and reporting problems	_____ / _____

Practical Factors: Satisfactorily complete the following practical factor under the supervision of a qualified operator:

REQUIREMENT	QUALIFIED SIGNATURE/DATE
1. Locate and handle film	_____ / _____
2. Locate, handle, and dispose of chemistry	_____ / _____
3. Locate and load film tanks	_____ / _____
4. JOBO preparation, use, and shutdown	_____ / _____
5. Process film	_____ / _____
6. Store and label film	_____ / _____

EXAMINATION AND CERTIFICATION _____ / _____
(LLE Imaging Specialist)

3009B Experimental Cryogenic Technician Qualification Card

Name _____

Prerequisites: Laser, Chemical, and Electrical Orientation Training
Radiation Worker Qualification

Knowledge Requirements: Demonstrate a knowledge of the following by satisfactorily completing an oral examination by a qualified individual:

REQUIREMENT	QUALIFIED SIGNATURE/DATE
1. Watch conditions, watch relief, procedural compliance, access, maintenance, tagout, safety, incidents (LFORM, LLE INST3000D)	_____ / _____
2. Briefing: "Cryo Shot Operations for XOPs" or "Cryo Target Facilities" (Vol. I, Chapter 11)	_____ / _____
3. SO 5-4 (DRAFT): "LaCave Cryo Shot Operations"	_____ / _____

Watch Standing Requirements: Stand the following watches under instruction of a qualified operator during Condition 2 shot operations unless otherwise indicated:

REQUIREMENT	QUALIFIED SIGNATURE/DATE
1. Experimental Cryogenic Technician during two spherical Cryogenic Shot cycles	_____ / _____ _____ / _____
2. Experimental Cryogenic Technician during two planar Cryogenic Shot cycles	_____ / _____ _____ / _____

Practical Factors: Satisfactorily complete the following practical factor under the supervision of a qualified operator:

REQUIREMENT	QUALIFIED SIGNATURE/DATE
1. Transfer of an MCTC from the staging area to parked at the Lower Pylon (3.1, 3.2.2, 3.3.3.1)	_____ / _____
2. Start up the Lower Pylon Cimplicity software (3.3.1.1)	_____ / _____
3. Support one LIM Activation. (I/O Handshake 3.3.1.2, LIM Motion Test 3.3.1.3)	_____ / _____
4. Perform a complete Lower Pylon Shot Cycle (3.3.3.2–3.3.3.6)	_____ / _____
5. Remove an expended planar target and replace it with a new one.	_____ / _____

6. Demonstrate Securing of the Lower Pylon and Chain Locker (3.3.4); Shut down the Lower Pylon Cimplicity Software (3.3.1.4) _____/_____

[All references are to SO 5–4 (DRAFT): "LaCave Cryo Shot Operations"]

Qualification Certification: Satisfactorily complete a comprehensive oral examination covering all the knowledge and practical requirements of this qualification.

EXAMINATION AND CERTIFICATION _____/_____
(Cryogenics and Tritium Facility Manager)

3010 Radiation Worker Qualification Card

Name _____

Knowledge Requirements: Demonstrate a knowledge of the following by satisfactorily completing an oral examination by a qualified individual:

REQUIREMENT	QUALIFIED SIGNATURE/DATE
1. Hazards of radiation (neutron, gamma, beta)	_____ / _____
2. Radiation and high radiation areas	_____ / _____
3. Basis of Target Bay Shield design	_____ / _____
4. Airborne, surface contamination, water-borne, and oil-borne limits for tritium and their basis	_____ / _____
5. Controlled surface contamination area	_____ / _____
6. Personnel exposure limits and monitoring requirements	_____ / _____
7. Anti-contamination clothing requirements	_____ / _____
8 Tritium spill and high airborne emergency procedures	_____ / _____
9. Radiation detectors/counters	_____ / _____
10. Radioactive material disposal procedures	_____ / _____

Practical Factors: Satisfactorily complete the following practical factor under the supervision of a qualified operator:

REQUIREMENT	QUALIFIED SIGNATURE/DATE
1. Establish a controlled surface contamination area	_____ / _____
2. Perform a tritium-wipe survey including operation of the scintillation counter and logging results	_____ / _____
3. Perform a Target Chamber gamma radiation survey including logging of results	_____ / _____
4. Decontamination of a tritiated diagnostic	_____ / _____
5. Calculate the expected neutron radiation level from a target shot expected to produce 10^{13} neutrons	_____ / _____

Qualification Certification: Satisfactorily complete a comprehensive oral examination covering all the knowledge and practical requirements of this qualification.

EXAMINATION AND CERTIFICATION _____ / _____
(LLE Radiation Safety Officer)

3011 Recertification Card

Name _____

Watchstation(s): _____
_____
_____
_____

Reading Requirements:

I certify that I have read applicable changes to the Volume II OMEGA Operating Procedures and the last month's LFM Day Orders.

_____ _____
Name of Watchstander Date

TRAINING WATCH REQUIREMENT	QUALIFIED SIGNATURE/DATE
1. _____ Watchstation	_____ / _____

Recertification: Satisfactorily complete an oral examination.

EXAMINATION AND CERTIFICATION	_____ / _____ (Applicable Group Leader)

Part IV
Standard Operating Procedures

4000 Procedural Compliance

The Safety Analysis Document (SAD) for the OMEGA Laser Facility identifies the safety hazards and how they are mitigated by design, interlock, and procedure. Of the hazards reviewed, protection from personnel exposure to hazardous levels of laser and nuclear radiation and high voltage requires that no personnel are in the hazardous areas during target shot operations. To assure that no personnel remain in hazardous areas upon establishing "closed access" as well as the need to avoid the potential for significant equipment damage dictates the need for formal compliance with approved operational procedures.

In the context of operating the OMEGA Laser Facility, formal procedural compliance means:

Only formally approved written procedures will be used in the conduct of shot operations. These procedures are contained in the OMEGA Operations Manual, Volume II, System Operation Procedures.

If an error or omission that prevents continuing is noted in an Operation Procedure, the system will be placed in a safe state and the operation will be halted until a formal written change to the procedure is approved by the Laser Facility Manager.

The System Operation Procedures will be referenced as required in the conduct of operations. For Shot Operations, the applicable procedures will be open and used as a check list by the Shot Director and Control Room Operators. For all other evolutions, e.g., system preoperational checks and start-up, system shutdown, and maintenance operations, the procedure will be referenced as frequently as necessary to ensure compliance with the procedural requirements.

4001 Control Room Access and Formality

The Control Room is the central control station for the operation of the OMEGA Laser Facility. To ensure the safe and proper operation of the facility, the atmosphere in the

Control Room must be formal and businesslike. To ensure the desired level of formality is maintained, the following will be enforced:

Access will be restricted to those who have a need to be there and will be strictly controlled by the Shot Director. During periods of power conditioning unit charging, as indicated by the flashing "closed access" signs outside the Control Room, no entry will be allowed.

No impromptu meetings or gatherings will take place in the Control Room.

No eating will be allowed in the Control Room.

No reading of unofficial or nonwork-related material.

4002 Control of Maintenance

Maintenance must be controlled to ensure the readiness of the Laser Facility to conduct shot operations and to determine the applicable post-maintenance inspections and tests that must be completed. Accordingly the following procedures will be followed:

The Shot Director's permission must be obtained prior to performing maintenance on or removing a system, subsystem, diagnostic, or equipment from service that is required to support scheduled shot operations.

The Shot Director will maintain an Equipment Status Log to document systems, subsystems, diagnostics, or equipment placed out of commission or in reduced status.

Corrective and preventive maintenance will be scheduled by the individual work centers in consonance with the Laser Facility operating schedule.

The completion of maintenance and the restoration of systems, subsystems, diagnostics, or equipment to service will be reported to the Shot Director.

4003 Equipment Status Log

The Shot Director will maintain an Equipment Status Log during both Watch Condition 1 and 2 that documents the current out-of-commission status of systems, subsystems, diagnostics, or equipment and the completion of required preoperational tests and inspections prior to shot operations. This log will be maintained in the Control Room and will be maintained in two sections as follows:

Out-of-Commission (OOC) List: This section will be a chronological listing of systems, subsystems, diagnostics, or equipment placed out of commission and will indicate the current OOC status. This list will be in the following format (Fig. IV-1 is a representative log sheet):

Time/Date Placed OOC	System, Diagnostic, or Equipment	Tagout, if required		Post Test		Time/Date Restored	SD Initial Here
		Enter next Number	Date Cleared	Enter Y/N	Date Completed		

Before restoring a system, diagnostic, or equipment and signing the time/date restored block, the Shot Director will ensure that both the tagout and post test requirements, as applicable, are completed.

Material Deficiency Lists: This section will be a listing of material deficiencies that do not place a system, subsystem, diagnostic, or equipment out of commission, but require documentation to ensure operator awareness and subsequent correction. The material deficiency lists will be segregated by work center (Controls, Experimental Operations, Laser Amplifiers, Laser Drivers, Laser Optomechanical, and Optics) and will be in the following format:

Time/Date Identified	System, Diagnostic, or Equipment	Time/Date Restored

Work center supervisors shall review their section of the material deficiency lists at least weekly to ascertain new items and update those that have been corrected. The material deficiency lists will be recopied monthly to eliminate items that have been corrected.

4004 Tagout/Lockout

To ensure personnel safety and to prevent equipment damage, positive procedures are required to prevent the inadvertent operation of systems or equipment placed out of commission for maintenance. Of particular concern is the risk of electrical shock, release of the stored energy from pressurized compressible fluids, or the release of toxic chemicals. As a facility becomes larger and more and more people become involved in the operation and maintenance of the same systems and equipment, reliance on a "single" cognizant person for his or her safety can no longer be assumed. Accordingly, it becomes increasingly likely that a breaker, switch, or valve will be inadvertently operated by an operator who is either careless or unaware of a system's maintenance status. Such actions can result in the personal injury or death (e.g., electrocution or entrapment by rotating equipment) of personnel performing maintenance or in the destruction of equipment, (e.g., starting a pump without oil). Accordingly, formal procedures are required to prevent the inadvertent operation of systems or equipment placed out of commission for maintenance.

As used in this procedure a tagout is defined as the placement of a tag on a breaker, switch, control device, or valve that states that it should not be operated. Lockout is defined as the installation of a physical barrier to operation such as a lock or the removal of a connecting link to prevent operation of the component being worked on.

The following policies apply to utilizing the tagout/lockout procedures described herein:

Each supervisor and maintenance technician will evaluate each maintenance action with respect to safety and the need to utilize these tagout/lockout procedures. If a risk exists of someone inadvertently operating a system opened for maintenance, appropriate breakers, switches, control devices, and/or valves will be tagged in the safe position by a red "DANGER DO NOT OPERATE" tag (as shown on p. IV-4) or will be physically locked to preclude operation. The Shot Director will be responsible for ensuring that these tagout/lockout procedures are used when appropriate prior to allowing maintenance to take place.

DANGER
DO NOT OPERATE

Tag No. _____ **Required Position** _____

Equipment ID _____

Breaker/Valve ID _____

Posted (Hung) by _____

_____ / _____
(Signature) (time and date)

Reason for Tag:

Breakers, switches, valves, etc., that are tagged will be verified by personal inspection to be in the appropriate position prior to hanging a "DANGER DO NOT OPERATE" tag. These tags will be securely affixed to the actual breaker, switch, or valve in a manner that ensures their visibility to anyone who might operate it. After the tag is hung, it will be signed by the person hanging it. Breakers and switches will be verified by observing their position relative to local on/off markings. Valves will be verified either by position indicators or physically verifying the valve by turning in the direction of the desired position.

The tag(s) shall be removed when maintenance is completed and the system or equipment is ready to be restored to service or operated for testing.

Under no circumstances will a breaker, switch, or valve that is tagged by a "DANGER DO NOT OPERATE" tag be operated.

Particular attention must be paid to systems or equipment that either has more than one source of power or is remotely controlled.

All electrical power systems containing >24 volts will be de-energized prior to performing maintenance, unless the procedures of **Section 4006** for working on energized components are employed. Tags will be used for protection on systems with voltages from 120 to <440 volts. Physical lockout will be used for protection on systems with a voltage of ≥440 volts.

A Tagout Log consisting of a tagout index and individual tagout sheets will be maintained in the Control Room by the Shot Director and will be administered as follows:

The Out-of-Commission List of the Equipment Status Log (Fig. IV-1) will serve a dual purpose as the tagout index. When a tagout is indicated as necessary, a sequential tagout number will be assigned and entered in the space provided.

An individual tagout sheet (Fig. IV-2) will be filled out for each individual system, subsystem, diagnostic, or equipment that requires a tagout. After the tagout sheet is completed by the maintenance person, the adequacy of the tagout coverage will be verified by the Shot Director who will indicate his/her authorization by signing the tagout sheet.

Once the tagout is authorized, the maintenance person will install the tags, and when all tags are installed, he/she will sign the tagout sheet; then maintenance may be started.

When maintenance and required preoperational inspections are completed, the maintenance person will remove the tags that were hung to support the maintenance. All tags removed will be delivered to the Shot Director, and the maintenance person will sign the tagout sheet to indicate the tags have been removed.

The Shot Director will check that all tags listed on the tagout sheet have been returned. He/she will then remove the respective tagout sheet from the active section of the tagout log and place it in the inactive section of the log. If no Post Test is required, the Shot Director will also update the Out-of-Commission List by indicating the date the equipment has been restored to service.

When a Post Test is completed after removal of the tags, the maintenance person will review the results with the Shot Director and certify that the equipment may be restored to service. The Shot Director will then update the Out-of-Commission List by indicating the date the equipment was restored to service.

An **audit** of the Tagout Log will be conducted weekly as follows:

Check the OOC List/Tagout Index against the Active Tagout Sheets to ensure they agree.

For all Active Tagout Sheets, verify by visual inspection that all associated tags are in place, the component is in the proper position, and the tag is properly completed and signed. Any deficiencies must be resolved by preparing new tagouts/tags as required.

Upon completion of the audit, the OOC List/Tagout Index will be recopied to list only the active items. All Inactive Tagout Sheets and associated tags should then be discarded.

4005 Target Chamber Entry

The Target Chamber is a confined space that requires special procedures to ensure safe entry. Additionally, radiation safety procedures must be followed to ensure the protection of personnel and to prevent the release and spread of radioactive contamination. {Note: because the space can be maintained in a condition safe for entry by continuous forced air ventilation, it is not a "permit-required confined space" as defined by OSHA [see OSHA standard "Title 29 CFR Part 1910.146(c)(5)].} To ensure safety and controlled entry follow the procedures of the LLE Radiological Controls Manual (LLEINST 6610), Section 3008, for initial entry and closeout.

4006 Safety

The safe operation of the Laser Facility is of paramount importance and will not be jeopardized. It is the responsibility of all personnel to follow applicable safety procedures. The failure to follow established safety procedures may result in appropriate disciplinary action up to and including dismissal. Since general and specific safety precautions, procedures, laws, and regulations exist from several authoritative sources (e.g., University Environmental Health and Safety procedures, state and local electrical and mechanical codes, NYS laser and radiation safety regulations, Laser Facility Manual Volume II, etc.), they will not be enumerated here.

The Laser Facility Manager has the overall responsibility for the safe operation of the Laser Facility under the general guidance and oversight of the Laboratory Safety Officer and the functional area safety officers (Chemical, Electrical, Laser, and Radiological). If a question arises with respect to safety, it should be resolved by referring to an authoritative reference before proceeding. Should situations arise where procedures are unknown or there are questions of interpretation, the appropriate functional area safety officer should be consulted before proceeding. These situations and questions will also be brought to the attention of the Laboratory Safety Officer before proceeding.

The following policies apply to safety throughout the Laser Facility:

No person will willfully operate, energize, or otherwise use any tool, system, or equipment that is known to have a safety defect.

Only personnel who are specifically trained and qualified will perform system or equipment maintenance.

No safety-related interlock, alarm, detector, or device will be overridden or disabled without the specific permission of the Laboratory Safety Officer.

Safety incidents and potentially unsafe practices or conditions will be reported immediately to the Shot Director who in turn will inform the Laser Facility Manager, the appropriated functional safety officer, and the Laboratory Safety Officer.

No person will intentionally allow him or herself to be shocked by electricity, inhale or eat hazardous chemicals or materials including radioactive material, expose themselves to laser radiation without appropriate protection, or expose themselves unnecessarily to nuclear radiation.

Appropriate safety protective equipment shall be worn when required. This includes appropriate goggles when exposed to laser light; safety glasses, rubber gloves and laboratory aprons when handling hazardous chemicals or cryogenic fluids; safety glasses when operating machine tools such as grinders, drills, lathes, milling machines, etc.; safety shields and rubber gloves when working on energized power sources; and safety harnesses when working aloft.

Systems and equipment shall be tagged out in accordance with **Section 4004** as required.

Only personnel trained and certified to operate machine shop equipment by a full-time LLE machinist will operate such equipment.

All personnel will comply with the electrical safety procedures detailed below.

Electrical Safety Procedures: Electrical or electronic equipment containing >24 volts shall be de-energized prior to performing corrective maintenance. This does not apply to taking readings on, making adjustments to, or trouble shooting electrical or electronic equipment when by equipment or instrument probe design the readings and adjustments can be made without risk of electrical shock. A risk of electrical shock exists if it is possible to inadvertently contact a live electrical circuit. If there is risk of shock and it is necessary to take readings on or perform maintenance adjacent to energized components, then the following procedures for working on energized equipment must be followed:

Permission to work on energized equipment must be received by the cognizant Group Leader and the Laboratory Safety Officer or the Electrical Safety Officer.

The equipment should be de-energized to the maximum extent possible.

A minimum of two personnel must be present. One who is actually performing the maintenance and one who acts as a safety monitor.

Insulating material should be laid out to the maximum extent practical to insulate the worker from ground and to protect against inadvertent contact with energized components.

Approved insulated rubber gloves should be worn if practical.

The safety monitor must be knowledgeable. As a minimum he or she must know how to de-energize the equipment, be in a position to observe the worker, and be in a position to pull/push the worker free in the event he or she receives an electrical shock. Care should be exercised that the safety monitor is not shocked in the process of freeing a shock victim. To this end, a rope or belt or personal momentum should be used to free the victim.

Someone qualified in CPR should be available in the Laboratory.

Insulated tools and instruments should be used.

A voltage tester should be used to verify which circuits are energized and which are de-energized before commencing maintenance.

4007 Communication Procedures

The effective and safe operation of OMEGA requires that communications be concise, precise, and formal. This applies to all face-to-face, headset, or public address communications. To ensure effective communications, the following standardized procedures apply to all OMEGA operations.

General

No informal or personal communications will be transmitted on headsets or the public address system.

Headsets will normally be worn by all watchstanders and Channel 1 should be the primary operations channel. The Shot Director (SD) may use the speaker at the SD station to allow Control Room visitors to monitor events.

Headset communications must be concise, precise, and formal and idle chatter should not occur. Do not interrupt communications in progress, unless you have an urgent communication affecting operations or safety.

For extended communications relative to troubleshooting, maintenance, or other less formal circumstances a clear/dedicated channel should be used.

To minimize circuit noise, close your microphone when not in use.

To avoid confusion, first names are not to be used in formal communications; rather, watchstation titles should be used or, if not on watch, either the last or full name will be used with title (Dr., Mr.) if appropriate.

Standard Communication Procedures

All communications that are either directive in nature or allow action to be initiated shall consist of a *to/from address, message, and acknowledgment* as follows:

To address—the station to which the message is intended, e.g., "Drivers, Beamlines, Shot Director," etc.

From address—the station that originates the message. The *from address* is not used for public address system announcements or in other circumstances where the originator of the message is obvious and cannot be confused. For example, when the Shot Director communicates that he/she is ready for completion of the checklist, it is obvious that the Shot Director is the originator. Voice recognition may also make it obvious as to who the originator is, so long as the receiver both recognizes the voice AND has knowledge that the individual is currently assigned to the watchstation from which the communication originated. Both the voice and the authority to issue a directive must be clear (i.e., while a specific individual has authority when actually standing watch, that person does not have authority to issue a directive that changes system status when he/she is not on watch).

Message—the order or informational item to be communicated.

Acknowledgment—the affirmation that a message is received and understood.

- if the message is a directive that requires action and includes letters, numbers, or a movement direction—the message must be acknowledged by repeating back the message followed by stating your station title and "aye, understood, roger," or another clear affirmative word indicating understanding. If the repeat back is in error, the originator will state "wrong," and will repeat the entire message.
- if the message is either informational or doesn't include letters, numbers, or direction or movement—the message need not be repeated back and may be acknowledged by simply stating your station title and "understood, aye, roger," or other clear affirmative word indicating understanding.

The following standardized terminology will be used for all oral communications.

Written	Spoken
Shot Director	Shot Director
Principal Investigator	PI
Laser Driver Operator	Drivers or LDO
Laser Driver Technician	LDT
Beamline Operator	Beamlines or BO
IR Alignment Laser Technician	IR-ALT
UV Alignment Laser Technician	UV-ALT
Power Conditioning Operator	Power Conditioning or PCO
Power Conditioning Technician	PCT
Experimental System Operator	Experimental or ESO
Experimental System Technician	EST
Laser Bay	Laser Bay
Target Bay	Target Bay
Capacitor Bay	Capacitor Bay
LaCave	LaCave
Pulse Generation Room	PGR
Driver Equipment Room	DER
Oscillator Room	Oscillator Room or OR
Darkroom	Darkroom
Vacuum Pump Room	Pump Room
Fan Room	Fan Room
Control Room	Control Room
(the number) 0	Zero
Alphabet A–Z	Alpha, Bravo, Charlie, Delta, Echo, Foxtrot, Gulf, Hotel, India, Juliet, Kilo, Lima, Mike, November, Oscar, Papa, Quebec, Romeo, Sierra, Tango, Uniform, Victor, Whiskey, X-ray, Yankee, Zulu (*this phonetic alphabet need only be used when necessary to avoid confusion*).

Equipment Nomenclature	Useful Lists of Accepted Acronyms
e.g., Main Large Aperture Ring Amplifier	Main LARA
Number 1 Spatial Filter Pump	Number One Spatial Filter Pump
To Start	Start
To Secure (Stop)	Secure
To Shut (Close)	Shut
To Open	Open

NOTE:

Many of the elements of the OMEGA system are designated by the "Stage, Cluster, Beam" convention, where

Stages are lettered A, B, ...F,
Clusters are numbered 1, 2, ... 6,
Beams are numbered 10–60.

The phonetic alphabet is generally used to convey the stage letter and the cluster and beam designation is properly pronounced as an ordered pair; e.g., say "Foxtrot One One," not "eff eleven."

The following are several example communications [in the correct sequence: *to address/from address/message // acknowledgment* (items included in parentheses ( ) are optional in the circumstance portrayed].

NOTE:

The acknowledgment must be a verbatim repeat back of the directive if the directive includes any numbers, letters, or direction (e.g., u/down, right/left). Otherwise, the acknowledgment may simply be the receiver's title and the affirmation, "Aye" (e.g., "Drivers Aye").

SD: "Drivers/(Shot Director) ready for checklist."
LDO: "Drivers Aye."

NOTE:

"Aye is an affirmative statement that means understood. The words "understood" or "roger" may be used in lieu of "aye."

LDO: "Beamlines/(Drivers) SSD driver spots available."
BO: "SSD spot available, Beamlines aye."

BO: Drivers/(Beamline) finished with SSD spot."
LDO: "(finished with SSD spot) Drivers, aye."

PI: "Experimental/PI (or name) steer TIM one up one hundred microns."
ESO: "Steer TIM One up one hundred microns, Experimental aye."

PCO: "PCT/(Power Conditioning)/safe PCU's Echo One Four and Foxtrot Three One."
PCT: "Safe PCU's Echo One Four and Foxtrot Three One, PCT, aye."

PCT: Power Conditioning/(PCT)/PCU's Echo One Four and Foxtrot Three One are safed."
PCO: PCU's Echo One Four and Foxtrot Three One are safed, Power Conditioning aye."

Example of erroneous repeat back: note the use of the word **"wrong"** and a complete repeat of the entire message.

PCO: "PCT/(Power Conditioning)/safe PCU Delta One Zero."
PCT: "Safe PCU Delta One One, PCT aye."

PCO: **"wrong"** PCT/(Power Conditioning)/safe PCU Delta One Zero."
PCT: "Safe PCU Delta One Zero, PCT aye."

Out-of-Commission List

		Tagout if req'd		Post Test			
Time/Date Placed OOC	System, Diagnostic, or Equipment	Enter Next No.	Date Cleared	Enter Y/N	Date Completed	Time/Date Restored	SD Initial Here

Figure IV-1

Tagout Sheet

Tagout Number _____

System or equipment name _____

Reason for tagout _____

_____

Post Test: _____

_____

(provide brief description or enter "N/A")

Tag suffix (-A,-B,...)	Breaker, switch, or valve identification	Position O = open/off S = shut	Tag Removed Initials/Date/ Time*	Post Test Initials/Date/ Time

Tagout authorized by _____ / _____
(Shot Director) (Time and Date)

Tags installed by _____ / _____
(sign after installing) (Installer) (Time and Date)

Tagout cleared by* _____ / _____
(sign when all tags removed) (Remover) (Time and Date)

Restored to Commission _____ / _____
(sign when post-test is complete) (Tester) (Time and Date)

*Complete after removal and deliver the removed tags to the Shot Director.

Figure IV-2

4008 Shot Request Forms and Administration

Execution of effective and safe OMEGA shots requires complete specification of the laser and diagnostic configuration, extensive advance planning, and many hours of system preparation prior to and during the actual shot day. The Shot Request Form (SRF) for each shot is the primary vehicle for recording and communicating the specifications for a shot. Supplemental tools and forms are used in planning and communicating the sequencing of related shots referred to as campaigns.

The SRF is a data base object that is created via inputs made at a web-based SRF user interface. This interface consists of a series of pages or screens called "forms" that collect information of various types. The forms include:

- General -- PIs, campaign identification, planned date, planned order, ...
- Driver – pulse shape, SSD modulation, ...
- Target – characteristics, unique identifier ...
- Beams – groups defined by energy, pointing, focus ...
- Target diagnostics – specified via a hierarchical series of location and set-up forms.

Each SRF is automatically assigned a unique, sequential, identifying number at the time that it is created. Appropriate controls are applied to limit both read and write access to the records.

The SRF can be viewed or printed, in part or in whole, to provide a standard format for review and implementation. On shot day, SRF data values are also accessed directly by the OMEGA Control System and used to assist the operators in preparing for and executing the shot. Once a SRF has been used to specify a system shot, it is considered expended and will not be reused. The SRF data values are retained indefinitely. The SRF values, indexed by the unique identifying number, may be retrieved for data assessment and can be copied to create new SRFs.

The Principal Investigator (PI) has the primary responsibility for preparation and coordination of the Shot Request Forms that define the shots for which he/she is responsible.

The SRF process may be initiated at any time. The key steps and milestones in the preparation and use of SRFs are:

- Monday, two weeks prior to the planned shot week -- The PI submits Shot Request Forms that define each unique shot configuration to LLE. This will precede and facilitate the "two-week briefing".

- Monday, one week prior to the planned shot week – The PI submits final Shot Request Forms for all of the planned shots to the Laser Facility Manager. The Laser Facility Manager shall be notified of all subsequent changes.

- During the interval between submittal and shot day – designated LLE personnel will review the SRFs and may edit/modify data values as required with the concurrence of the PI. Personnel authorized to edit/modify SRFs include diagnostic instruments specialists, the Laser Facility Manager, and the functional managers charged with implementing the necessary shot preparations.

- Shot day – the PI shall inform the Shot Director of any change in the planned shot order.

- Pre-Shot – The Shot Director and designated system operators may modify SRF data values for the shot that is currently underway with the concurrence of the PI. These changes shall for the purpose of dealing with situations or details that could not have been anticipated earlier. All such changes shall be implemented and verified prior to charging for the shot.

- Post shot – The authorized persons may edit the SRF data to capture the actual shot conditions for a limited period after the SRF has been used to specify a system shot. This shall be for the purpose of facilitating data interpretation or replication of the shot.

MEMORANDUM 13 August 2008

TO: Samuel Morse

FROM: R. L. McCrory

SUBJECT: Omega Facility Restart

CC: D. Jacobs-Perkins, S. J. Loucks, D. Meyerhofer, J. Soures, K. Thorp

As a result of the personnel accident on 6 August 2008, all potentially hazardous operations have been suspended at LLE. This memo describes the process that will be followed to restart maintenance (Phase 1) and operation (Phase 2) of the OMEGA and OMEGA EP laser systems.

The following facility restart effort applies to the following areas:

Laser Sources/Drivers
Laser Amplifiers
Power Conditioning
Opto-mechanical System
Experimental Operations
Cryogenic Operations (for OMEGA)

Phase I: Resumption of Watch Condition 1 Maintenance Activities

Step 1

Each Group/Section Leader will review the safety of watch condition 1 operating procedures with the appropriate qualified operators for each of the subsystems.

Step 2

The Group/Section Leader and group members will perform a safety audit of their subsystem. This will include:

4. A standard safety inspection of the facility, including highlighting any ergonomic issues.
5. Assembling a list of all potential safety concerns in the appropriate subsystem and inspecting them, noting any potential deficiencies.
6. Assuring that condition 1 operating procedures that involve sources of hazardous potential are up-to-date and that appropriate interlocks are in place and functional.

Sources of hazardous potential include:

- Laser systems
- High voltage
- Chemicals

- Radiation sources
- Thermal sources (hot and cold)
- Mechanical devices:
    i. Pressurized systems,
    ii. Vacuum systems, including purge and vent systems,
    iii. Structures and/or devices that contain significant mechanical potential or kinetic energy
- Rigging and installation systems.

Upon completion of this step, the Group/Section Leader will provide written confirmation, as well as a list of potential concerns and the list of sources of hazardous potential to the Laser Facility Manager.

Step 3

The Laser Facility Director and Laser Facility Manager will provide a recommendation about resuming condition 1 activities. There are three possible recommendations:

- Condition 1 shutdown operations can resume with no restrictions,
- Limited operations, with restrictions specified,
- No Condition 1 operations until significant issues are resolved.

Step 4

Upon receiving a positive recommendation, the OMEGA Facility Director will request permission from LLE's Director to resume watch condition 1 shutdown operations on the OMEGA and OMEGA EP Facilities. Approval may be necessary on a sub-system by sub-system basis.

Phase II: Resumption of Watch Condition 2 Shot Operations

Step 1

Each Group/Section Leader will review safety of watch condition 2 operating procedures with the appropriate qualified operators for each of the subsystems.

Step 2

The Group/Section Leader and group members will perform a safety audit of shot operating procedures that involve sources of hazardous potential. Upon completion of this step, the Group Leader will provide written confirmation, as well as a list of potential concerns and the list of sources of hazardous potential to the Laser Facility Manager.

Step 3

A safety inspection will be carried out in each subsystem, paying particular attention to sources of hazardous potential. The inspection team will consist of some or all of the following personnel, depending on the sources of hazardous potential identified:

- OMEGA Facility Division Director,
- OMEGA Laser Facility Manager,
- LLE Chemical Safety Officer,
- LLE Laser Safety Officer,
- LLE Electrical Safety Officer,
- LLE Radiological Safety Officer,
- Mechanical Engineer

The safety inspection team will provide a list of concerns to the LLE Director as well as a recommendation about resuming operations. There are three possible recommendations:

- Operations can resume with no restrictions,
- Limited operations, with restrictions specified,
- No Operations until significant issues are resolved.

Step 4

The Experimental Operations Group Leader will identify all diagnostics that have not been qualified in accordance with LLE Instruction 7700 subsequent to its issuance. These diagnostics will be placed out of commission and rendered safe pending their qualification in accordance with LLE Instruction 7700.

Step 5

Upon receiving a positive recommendation and upon completion of the restart Incident Report Corrective Actions, the OMEGA Facility Director will request permission from LLE's Director to resume shot operations on the OMEGA and OMEGA EP Facilities.

UNIVERSITY of ROCHESTER

LABORATORY FOR LASER ENERGETICS

Robert L. McCrory, Jr.
Vice Provost, CEO, and Director

MEMORANDUM

25 August 2008

TO: Joel Seligman, UR President

FROM: Robert L. McCrory, LLE Director

SUBJECT: Restart of OMEGA Shot Operations

CC: Mark Cavanaugh, EH&S Director
Doug Jacobs-Perkins, Chief Safety Officer, LLE

Actions Completed to Ensure Safety to Restart:

Safety at the Laboratory for Laser Energetics has always been of utmost importance, and LLE has historically been recognized as having a very effective safety program. However, we also recognize the critical importance of adjusting and enhancing our safety procedures in response to new events, new information, changes in design and/or experiment based modifications. As you know, we recently shut down LLE operations in order to perform a comprehensive review of our safety systems. That review was completed in preparation for a restart of LLE operations. We have allowed full access and coordinated our review with the Office of Environmental Health and Safety, and in conjunction with that office we are of the opinion that we are ready to restart. The purpose of this memorandum is to provide you with an overview of the activities and conclusions that support that recommendation.

Our review reconfirmed that the vast majority of the safety procedures in place at LLE are appropriately comprehensive and specific to the activities of the lab and the risks presented. However, we did identify an important opportunity for safety systems enhancement during our review. Specifically, we recognized an opportunity to strengthen our procedures for activating all new equipment and systems. On further consideration and in the interests of lab safety, we have determined to apply the same rigorous process across the laboratory. The wording of the applicable instruction (INST 7700) was revised to clarify and reinforce the procedure that no system or equipment should be operated before the commissioning procedure is completed. We are confident that the revisions to INST 7700 will standardize our safety procedures and ensure consistency, which will maximize LLE safety.

UR LLE

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rmcc@lle.rochester.edu

To ensure the safe resumption of operations the following corrective actions have been completed:

1) The instruction governing the implementation of new diagnostics (LLEINST 7700 Critical Equipment Qualification Checklist (CEQC)) was reviewed and updated to require a safety analysis and safety inspection prior to operation. The detailed requirements of the qualification checklist must be completed prior to equipment or system use. Additionally, the requirements of this instruction have been extended to apply to all new or modified equipment and systems across all LLE laboratories.

2) All equipment, including diagnostics that have not completed all elements of the qualification procedure were identified, tagged out of commission and placed in a safe condition pending requalification. Although the LLE may restart operations, this equipment will not be used until it has gone through an Operational Readiness Review and has been fully qualified.

3) As noted above, all LLE laboratories and the entire OMEGA facility were shutdown pending complete review of all safety procedures. Each group leader was assigned the task of reviewing safe operating procedures with the appropriate group members in each LLE laboratory. The group leaders and members were also charged with the responsibility to perform a safety audit of every LLE laboratory. This included: a) an inspection of the laboratory, including highlighting any ergonomic issues; b) identifying all sources of hazards; and c) assuring that proper procedures are in place for each identified hazard. After completion of this step, the group leaders provided written confirmation to the Division Director. This was then followed up by a separate safety inspection of each LLE laboratory, by an Inspection Team including (depending on the nature of the identified hazards):

- Engineering Division Director (Chair)
- Facility Operations Division Director
- Experimental Division Director
- Administrative Division Director
- LLE Chemical Safety Officer
- LLE Electrical Safety Officer
- Mechanical Engineer
- LLE Radiological Safety Officer
- Facilities and Maintenance Group Leader

This multistep process of reviewing safe operating procedures, group member/Group Leader safety audit of respective laboratories, safety inspection by Division Directors and safety officers was completed on 20 August 2008. All safety deficiencies were corrected, or the equipment was tagged out to preclude operation and will not be used until it is fully qualified. An essentially identical process was followed for the OMEGA and OMEGA EP laser systems. The laboratories were restarted with the approval of the Laboratory Director on the recommendation of the Division Director. All significant safety deficiencies were reported to the University Environmental Health and Safety Office which confirmed correction and will independently audit on a going forward basis.

4) All OMEGA Facility and Experimental Division personnel involved with the design, assembly, installation, or operation of critical equipment and experimental diagnostics were briefed on the following:

- The requirements of LLEINST 7700 including instruction that no critical equipment or OMEGA experimental system diagnostic will operated until the completion of all requirements including final inspection by qualified inspectors and completion of an Operational Readiness Review.
- Only qualified on watch operators will operate OMEGA facility equipment with the exception that diagnostic specialists may startup and acquire data from self contained equipment such as streak cameras.
- Equipment will be installed in the OMEGA facility only by qualified personnel designated by the OMEGA Facility and Functional Engineering Group Leaders.
- All personnel who either design or install pressurized systems will complete a course of instruction relative to design and safety requirements. This course will be patterned after the LLNL course syllabus.

5) In addition, the following staffing changes have been implemented:

- Dr. Douglas Jacobs-Perkins was appointed as the LLE Safety Officer replacing Mr. Steven J. Loucks who retired 30 June 2008.
- A new safety officer position of Mechanical Safety Officer was instituted in addition to the positions of Laser, Electrical, Fire, Chemical, and Radiation Safety Officers. Mr. Milton J. Shoup III was appointed as the Mechanical Safety Officer.

Rationale for Restart:

A restart is recommended based on the assurance that the corrective actions taken will ensure safe operations. Considering that it is safe to resume operations, it is essential that operations be resumed for the following reasons:

The Laboratory's continued existence depends on resumption of operations in support of the National high-energy-density-physics program. Additionally, the livelihood of over 400 people depends on the Laboratory resuming its science program. In the interests of LLE personnel, a restart of target shot operations is essential.

The National Ignition Campaign, as well as basic science research through the National Laboratory User Facility (NLUF) program and high-energy-density program, requires experimental shots on OMEGA and OMEGA EP. LLE's funding is directly tied to deliverables that require experimental target shots. Should LLE not restart in the short term, its continued viability could be in significant jeopardy.

OMEGA Shot Request Form

UR LLE

Go To RID#

This RID#: 25865
Last Modified: 08-Aug-2008 11:49:53

Facility Status
Comments/Problems

XOPS Beamlines

General > Drivers > Target > Beams > TIM > Fixed > Neutronics

Help

Neutron Diagnostic Configuration (Help)

Select Primary Radiation: DT

Enter expected (not estimated) yield 5.00e+12

Defaults - **Neutron detectors recommended for the above parameters**

- Selections may be edited.
- Press Update to save the final configuration.

Diagnostic Description	Priority	
Activation Retractor Copper (ACTR)	Primary	Set up
CVD Neutron Bang-Time Detector 1 (CVDNBT)		
H10 CVD at 5.0m 5.0MCVD (H10CVD)		
H10 Photo Diode at 5.3m PDD99 (PDC)		
H10 Photo Diode at 5.3m PDO40 (PDC)		
H15 Re-entrant Tube CVD 1-6 (H15DCVD)		Set up
High Yield Neutron Bang-Time Detector 1 (HYNBT)	Secondary	
LANL LDRD Beta Mix P4G (BMIX)		Set up
LANL LDRD Beta Mix SCNT (BMIX)		Set up
LANL LDRD Beta Mix SiTel (BMIX)		Set up
NIF nTOF detector 1 (NIF-NTOF)		Set up
Neutron Bang-Time Detectors LLE (BTDET)		
Neutron Temporal Diagnostic 1 (NTD)	Primary	Set up
P11-NBT4.5m 1 (P11_NBT45)		Set up
Particle Temporal Diagnostic N (PTD)		Select PTD on TIM 5
Scintillator Counter A 3M LARD (SCC)		
Scintillator Counter B 2x2 (SCC)		
Scintillator Counter C 3M NTOF (SCC)		
Scintillator Counter D 5.4M NTOF (SCC)		

Scintillator Counter E 1.7M NTOF (SCC)	
Scintillator Counter F 12M NTOF L (SCC)	Primary
Scintillator Counter G 12M NTOF H (SCC)	Primary

nTOF LaCave Diagnostics

Set up

Setup sheets are not required for the NIS diagnostics.

Comments:

Reminder: Use the NTD Set up page to define the NTD configuration.

Campaign Editor | Drivers Editor | Beam Editor | SRF Auditor

Update | Copy ... | Reports | Station Reports

Enclosure (1)

Preliminary LLE Incident Report **Number 125**

Area: OMEGA Target Bay

Key Words: personal injury
High Yield Neutron Temporal Diagnostic

1. **DESCRIPTION of INCIDENT**: (describe what happened including indications and the results of the investigation)

At 1824h on 6 August 2008 a serious personal injury occurred in the OMEGA Target Bay while an experimental campaign entitled DT ratio with Dr. H. Herrmann of Los Alamos National Laboratory (LANL) as the lead Principal Investigator (PI) was being conducted. Subsequent to shot 52072, the diagnostic co-PI for the High Yield Neutron Temporal Diagnostic (HYNTD), commonly referred to as the Light-Pipe, that was being operated in the gas (CO_2) Cherenkov mode, requested that the CO_2 pressure be reduced from 100 psig to 50 psig. A Senior Laboratory Engineer (SrLE) who was not an assigned OMEGA watch stander was tasked by the diagnostic co-PI to reduce the pressure. The SrLE tasked does not normally perform this function, but he indicated he knew how to do it, and he proceeded to the Target Bay to perform the pressure reduction.

During this action, four other personnel in the Target Bay (two assigned Experimental Technician watch standers, a LANL technician, and an NSTec technician), heard what was described as a loud bang, a gas pressure release, and a crashing sound. When they investigated they found the SrLE unconscious, face down, and bleeding profusely on the Target Bay floor. They observed the support structure (110 lb) for the Light-Pipe and remnants of the Light-Pipe in the vicinity. They immediately reported their findings to the Control Room and administered CPR to the victim when his breathing stopped several minutes after the event. The Shot Director called 911 and the paramedics arrived at about 1834 and took over first aid and transport to of the injured person to Strong Memorial Hospital.

The investigation revealed that the Light-Pipe structure fell from its support due the use of inadequate mounting bolts (three ¼ inch bolts rather than the apparent design intent of five ½ inch bolts).

2. **IDENTIFICATION OF APPARENT CAUSE**

X Personnel **X Procedure** **_____Equipment** **_____Material**

This incident was caused by the failure to rigorously follow the procedures of LLEINST 7700 Design and Integration of Equipment, and the failure of management to comply with the requirements of LLEINST 3000 Laser Facility Organization and Regulation Manual that requires all new diagnostics be fully qualified two weeks before the date of an experiment. Additionally, the mechanical design and assembly of the Light-Pipe diagnostic was not thorough, and it was assembled and installed by inexperienced and unqualified personnel. Contributing to this incident was a serious drain of resources caused by the

simultaneous construction of the OMEGA EP project while at the same time continuing to operate OMEGA. Specifically:

- The Experimental Operations Group Leader improperly allowed "developmental diagnostics" to be exempted from completing the requirements of LLINST 7700 including final certification for operation. While the instruction allowed operation by developers under operational shot conditions, it does not allow exceptions to the fabrication, installation, and qualification phase requirements including the performance of an Operational Readiness Review. Since the Light-Pipe was exempted from the LLEINST requirements, an Operational Readiness Review that includes the preparation and completion of written fit and function tests, installation, and qualification test plans was not performed.
- The PI and project coordinator for the HYNTD project did not specify to the design engineer that the Light-Pipe would be operated at other than atmospheric pressure. Consequently, the mechanical design did not include the design and specification of the pressure control equipment.
- The Mechanical Design was deficient:
  - The assembly drawing was incomplete and did not represent the as built condition.
  - The fasteners to mount the structure to the supporting target area structure were not specified (however, there were five ½ inch holes provided on the mounting plate).
  - Two of the five ½ inch holes on the mounting plate didn't align with any of the target area structure.
  - The gas pressurization system was not included in the design.
  - The pressure cell cap assembly method at the target chamber end was not specified. Epoxy was chosen for this joint but was not analyzed by ME.
- The desire of the PI to use the diagnostic on impending OMEGA experiments coupled with the failure of management to enforce the requirement that this diagnostic be qualified two weeks before an experiment and a shortage of qualified mechanical assemblers caused the diagnostic to be assembled, installed, and operated by inexperienced and unqualified personnel. This caused:
  - The support structure to be installed with inadequate size and number of fasteners. Experimental Operations personnel participated in the installation of ¼ inch bolts in ½ inch holes but this decision was not elevated to Mechanical Engineering (ME) for analysis
  - The pressure control system to be installed without relief protection and with fittings and a regulating valve that was not rated for the industrial gas bottle pressure source.
  - The procedure to operate the pressure regulating system was not approved and was incorrect.
  - When the mounting of the support structure was questioned by the Principal Investigator, it was not brought to the attention of senior management or the Mechanical Engineering Design Group.

3. CORRECTIVE ACTIONS

a. **IMMEDIATE ACTIONS** (actions taken at the time of the incident to establish stable conditions)

(1) First aid was rendered and 911 called.

(2) Appropriate senior personnel were notified including, the Laser Facility Manager, OMEGA Facility Director, Associate Director for Operations, LLE Laboratory Director, UR Environmental Health and Safety Officer, UR President, and Administrator of the National Nuclear Security Administration.

(3) The Occupational Health and Safety Administration (OSHA) was notified

(4) The accident site was secured pending investigation.

b. **TEMPORARY CORRECTIVE ACTIONS** (actions taken to resume normal operations in advance of completion of permanent actions, identify specific actions, persons responsible, and completion due date)

(1) All potentially hazardous operations at LLE were suspended pending investigation and completion of the requisite actions to ensure the safety of all personnel.

c. **PERMANENT CORRECTIVE ACTIONS** (permanent corrective actions to prevent recurrence, identify specific actions, person responsible, and completion due date)

(1) Non OMEGA and OMEGA EP laboratories will be restarted after the completion of the requirements specified in R.L. McCrory memorandum dated 13 August 2008 (attached). This required a multistep process of reviewing safe operating procedures, group member/Group Leader safety audit of respective laboratories, safety inspection by Division Directors and safety officers, resolution of significant issues, and approval of the Laboratory Director to resume operations upon the recommendation of the appropriate Division Director.

(2) OMEGA and OMEGA EP shutdown watch condition I operations will be resumed after the completion of the requirements specified in R. L. McCrory memorandum dated 13 August 2008 (attached). This required a multistep process of reviewing safe operating procedures, group member/Group Leader safety audit of respective laboratories, safety inspection by Division Directors and safety officers, resolution of significant issues, and approval of the Laboratory Director to resume operations upon the recommendation of the OMEGA Facility Director.

(3) Restart of OMEGA and OMEGA EP watch condition II shot operations will be resumed after the completion of the following additional requirements:

(a) Identification of all experimental diagnostics that have not completed the final LLEINST 7700 Critical Equipment Qualification Checklist (CEQC) process, placing these systems out of commission, and ensuring them to be

in a safe condition. These systems will not be returned to service until the requirements are completed. The following diagnostics were identified, have been verified to be in a safe condition, and were placed out of commission:

- Active Shock Breakout Diagnostic (ASBO) – Operating and configuration procedures are required
- Charged Particle Spectrometer #1 (CPS 1) – Operating procedures are required
- Charged Particle Spectrometer #2 (CPS 2) – Operating procedures are required.
- EMP monitors (EMPMON) – CEQC review and operating procedures are required
- Neutron Diagnostic Inserter (NDI 5) – Redesign, CEQC review, and operating procedures are required.
- 351 Scatter Calorimetry (SCCAL) – Installation and operating procedures and safety review are required.
- X-Ray calorimetry (XRCAL) – installation and operating procedures and safety review are required.
- High Yield Neutron Bang Time (HYNBT) – Full CEQC completion is required.
- High Yield Neutron Temporal Diagnostic (HYNTD) – Redesign and a complete CEQC review is required.
- Neutron Fluence Array (NFA1) – Full CEQC review is required.
- Opacity X-Ray Imager (OXI) – Completed CEQC package must be approved.
- Neutron Scintillators (SSC A-G NTOF) – Mechanical configuration review, installation, inspection, and operating procedures are required.
- TIM based PCD (PCD-1) – Full CEQC completion is required.
- PJX X-Ray Streak Camera (PJX) – Ten inch (diagnostic) manipulator (TIM) installation and operating procedures are required.
- Ultra Fast X-Ray Streak Camera (UFXRSC) – TIM installation and operating procedures are required.
- H11/P11 LLNL PCDs – vacuum system operation procedures and HV interlock.
- TIM TPS (TTPS) – Install and operating procedures.

(b) All OMEGA Facility and Experimental Division personnel involved with the design, assembly, installation, or operation of critical equipment and experimental diagnostics will be trained on the following:

- The requirements of LLEINST 7700 emphasizing that no critical equipment or OMEGA experimental diagnostic will operated until the completion of all requirements including final inspection by qualified inspectors and completion of an Operational Readiness Review.
- Only qualified on watch operators will operate OMEGA facility equipment with the exception that diagnostic specialists may startup and acquire data from self contained equipment such as streak cameras.
- Equipment will only be installed in the OMEGA facility by qualified personnel designated by the OMEGA Facility and Functional Engineering Group Leaders.

(c) LLE instruction will be revised to include a risk assessment and an inspection by the appropriate functional engineering group of all installations with emphasis on those areas with a risk other than zero.

(d) No new or modified experimental diagnostic will be operated unless all of the requirements of LLEINST 7700 have been completed and all certification signatures have been obtained.

(4) The following corrective actions are not prerequisite to the restart of OMEGA but will be completed as indicated:

(a) A chief LLE Safety Officer will be designated. (**Action:** R. L. McCrory by 25 August 2008)

(b) A Mechanical Safety Officer will be designated. (**Action:** R. L. McCrory by 25 August 2008)

(c) All personnel who either design or install pressurized systems will complete a course of instruction relative to design and safety requirements. This course will be patterned after the LLNL course syllabus. (**Action:** M. Shoup by 15 December 2008).

(d) Additional corrective actions, if any, identified by OSHA and University of Rochester Environmental Health and Safety will be completed.

4. **SUBMITTED BY** Samuel Morse **Date** 8/19/08
Person Investigating the Incident

5. **REVIEWED BY** a. Keith R Thorp **Date** 8/19/08
Laser Facility Manager

b. Samuel Morse **Date** 8/19/08
Laser Facility Director

c. _____ Date 08/19/2008
Associate Director for Operations

6. APPROVED BY _____ Date 08/19/2008
Laboratory Director

MEMORANDUM 13 August 2008

TO: LLE Staff

FROM: R. L. McCrory

SUBJECT: Restarting Operations

As a result of the accident on 6 August 2008, all potentially hazardous operations have been suspended at LLE. This memo describes the process that will be followed to allow operations in individual laboratories to be resumed. Note that this does not include the OMEGA or OMEGA EP laser systems. Their restart will be handled separately. A list of the laboratories covered by this memo is attached.

Step 1

Each group leader will review safe operating procedures with the appropriate group members for each of their laboratories.

Step 2

The group leader and group members will perform a safety audit of their laboratories. This will include:

1. An inspection of the laboratory, including highlighting any ergonomic issues.
2. Assembling a list of all sources of hazards in the laboratory and inspecting them, noting any concerns.
3. Assuring that operating procedures that involve sources of hazards are up-to-date and that appropriate interlocks are in place.

Sources of hazards include:

- Laser systems
- High voltage
- Chemicals
- Mechanical devices:
    i. Pressurized systems,
    ii. Vacuum systems, including purge and vent systems,
    iii. Structures and/or devices that contain significant mechanical potential or kinetic energy
- Thermal sources (hot and cold)
- Radiological sources
- Rigging and installation systems

Upon completion of this step, the group leader will provide written confirmation and the list of sources of hazards, as well as a list of concerns and to the Division Director.

Step 3

A safety inspection will be carried out in the laboratories. The inspection team will consist of some or all of the following personnel, depending on the hazards identified:

- Engineering Division Director (Chair)
- Facility Operations Division Director
- Experimental Division Director
- Administrative Division Director
- LLE Chemical Safety Officer
- LLE Laser Safety Officer
- LLE Electrical Safety Officer
- Mechanical Engineer
- LLE Radiological Safety Officer
- Facilities and Maintenance Group Leader

The safety team will provide a list of concerns to the Division Director as well as a recommendation about resuming operations. There are three possible recommendations:

- Operations can resume with no restrictions,
- Limited operations, with restrictions specified,
- No Operations until significant issues are resolved.

Step 4

Upon receiving a positive recommendation, the Division Director will request permission from LLE's Director to resume operations in that laboratory.

MEMORANDUM 13 August 2008

TO: Samuel Morse

FROM: R. L. McCrory

SUBJECT: Omega Facility Restart

CC: D. Jacobs-Perkins, S. J. Loucks, D. Meyerhofer, J. Soures, K. Thorp

As a result of the personnel accident on 6 August 2008, all potentially hazardous operations have been suspended at LLE. This memo describes the process that will be followed to restart maintenance (Phase 1) and operation (Phase 2) of the OMEGA and OMEGA EP laser systems.

The following facility restart effort applies to the following areas:

Laser Sources/Drivers
Laser Amplifiers
Power Conditioning
Opto-mechanical System
Experimental Operations
Cryogenic Operations (for OMEGA)

Phase I: Resumption of Watch Condition 1 Maintenance Activities

Step 1

Each Group/Section Leader will review the safety of watch condition 1 operating procedures with the appropriate qualified operators for each of the subsystems.

Step 2

The Group/Section Leader and group members will perform a safety audit of their subsystem. This will include:

4. A standard safety inspection of the facility, including highlighting any ergonomic issues.
5. Assembling a list of all potential safety concerns in the appropriate subsystem and inspecting them, noting any potential deficiencies.
6. Assuring that condition 1 operating procedures that involve sources of hazardous potential are up-to-date and that appropriate interlocks are in place and functional.

Sources of hazardous potential include:

- Laser systems
- High voltage
- Chemicals

- Radiation sources
- Thermal sources (hot and cold)
- Mechanical devices:
    i. Pressurized systems,
    ii. Vacuum systems, including purge and vent systems,
    iii. Structures and/or devices that contain significant mechanical potential or kinetic energy
- Rigging and installation systems.

Upon completion of this step, the Group/Section Leader will provide written confirmation, as well as a list of potential concerns and the list of sources of hazardous potential to the Laser Facility Manager.

Step 3

The Laser Facility Director and Laser Facility Manager will provide a recommendation about resuming condition 1 activities. There are three possible recommendations:

- Condition 1 shutdown operations can resume with no restrictions,
- Limited operations, with restrictions specified,
- No Condition 1 operations until significant issues are resolved.

Step 4

Upon receiving a positive recommendation, the OMEGA Facility Director will request permission from LLE's Director to resume watch condition 1 shutdown operations on the OMEGA and OMEGA EP Facilities. Approval may be necessary on a sub-system by sub-system basis.

Phase II: Resumption of Watch Condition 2 Shot Operations

Step 1

Each Group/Section Leader will review safety of watch condition 2 operating procedures with the appropriate qualified operators for each of the subsystems.

Step 2

The Group/Section Leader and group members will perform a safety audit of shot operating procedures that involve sources of hazardous potential. Upon completion of this step, the Group Leader will provide written confirmation, as well as a list of potential concerns and the list of sources of hazardous potential to the Laser Facility Manager.

Step 3

A safety inspection will be carried out in each subsystem, paying particular attention to sources of hazardous potential. The inspection team will consist of some or all of the following personnel, depending on the sources of hazardous potential identified:

- OMEGA Facility Division Director,
- OMEGA Laser Facility Manager,
- LLE Chemical Safety Officer,
- LLE Laser Safety Officer,
- LLE Electrical Safety Officer,
- LLE Radiological Safety Officer,
- Mechanical Engineer

The safety inspection team will provide a list of concerns to the LLE Director as well as a recommendation about resuming operations. There are three possible recommendations:

- Operations can resume with no restrictions,
- Limited operations, with restrictions specified,
- No Operations until significant issues are resolved.

Step 4

The Experimental Operations Group Leader will identify all diagnostics that have not been qualified in accordance with LLE Instruction 7700 subsequent to its issuance. These diagnostics will be placed out of commission and rendered safe pending their qualification in accordance with LLE Instruction 7700.

Step 5

Upon receiving a positive recommendation and upon completion of the restart Incident Report Corrective Actions, the OMEGA Facility Director will request permission from LLE's Director to resume shot operations on the OMEGA and OMEGA EP Facilities.

EXHIBIT D

UNITED STATES DISTRICT COURT
WESTERN DISTRICT OF NEW YORK

SAMUEL M. ROBERTS,

Plaintiff,

vs.

LOS ALAMOS NATIONAL SECURITY, LLC, AWE, PLC., MASSACHUSETTS INSTITUTE OF TECHNOLOGY,

Defendants,
Third-Party Plaintiffs,

vs.

UNIVERSITY OF ROCHESTER

Third-Party Defendant.

SUPPLEMENTAL RESPONSE TO PLAINTIFF'S FIRST DEMAND FOR DISCOVERY AND INSPECTION

Civil No. 11 CV 6206L

Defendant/Third-Party Plaintiff, Los Alamos National Security, LLC (hereinafter "Los Alamos"), by and through its attorneys, Woods Oviatt Gilman LLP, provides this Supplemental Response to Plaintiff's First Demand for Discovery and Inspection, as follows:

PRELIMINARY STATEMENT

Defendant, Los Alamos, repeats and realleges the contents of its original Preliminary Statement and General Objections as set forth in its original Response to Plaintiff's First Demand for Discovery and Inspection as if fully restated herein.

SUPPLEMENTAL RESPONSE TO SPECIFIC DEMANDS

1. Any and all email, correspondence or documentation relating to the DT Ratio experiment being conducted at the University of Rochester, Laboratory for Laser Energetics (hereinafter "LLE") on August 6, 2008, including but not limited to the following:

a. Draft and final Target Request Forms.

Woods Oviatt Gilman LLP
700 Crossroads Building
2 State Street
Rochester, New York 14614

b. Draft and final experiment proposals or experiment proposal templates.

c. Draft and final Shot Request Forms.

d. Minutes of or notes taken any meetings relative to the DT Ratio experiment.

e. VISRAD files.

f. Experiment Reviews.

g. Draft and final Shot Effectiveness Forms.

h. Draft and final Experimental Critiques.

i. Minutes of or notes taken at any meetings relative to the accident resulting in Plaintiff's injuries.

Response:

Defendant Los Alamos objects to this demand as excessive overbroad and unduly burdensome. The DT Ratio campaign encompasses a multi-year project and was not limited to any one day experiment. As stated, the demand is far too broad to allow Defendant Los Alamos to respond in any meaningful manner. Further, as stated, the demand seeks substantial quantities of information that has absolutely no relevance to the events that took place on the day of the plaintiff was injured or to the facility used on that day. The demand seeks information that is technical in nature, which is so far removed from the controversy in dispute that Defendant Los Alamos cannot meaningfully provide more detailed objections. At the time of the Plaintiff's injuries, it is undisputed that Plaintiff was involved in working with equipment developed, designed, built, installed, maintained, and operated by Third-Party Defendant University of Rochester, and therefore, this demand appears more properly directed towards the work being conducted by that party on the day in question, and Defendant Los Alamos is not the proper

party to respond. To the extent that it is undisputed that Plaintiff was not in any physical proximity to any equipment involved in any of Defendant Los Alamos' experiments at the time of his injuries, Defendant Los Alamos' work on that day is entirely unrelated to the events which are the subject of this action. To the extent that this demand could be construed so broadly as to include attorney-client privileged documents or documents subject to the work-product privilege, Defendant Los Alamos interprets this request to exclude obviously privileged material connected to this litigation. Defendant Los Alamos further objects to this demand as confusing insofar as a number of the subsections lack context to afford a meaningful reference. In the event that Plaintiff propounds specific and more narrowly targeted requests for specific relevant documents, Defendant Los Alamos reserves the right to amend and/or supplement its responses. Defendant Los Alamos further refers to its initial disclosures, which may be construed to fall within the scope of this demand.

Subject to and without waiving the foregoing responses, see **Exhibit "A"** hereto.

2. Any and all email, correspondence or documentation exchanged by and/or between the University of Rochester, Los Alamos National Security LLC, AWE, Plc., and/or Massachusetts Institute of Technology (or related parties) relative to the DT Ratio experiment conducted on August 6, 2008 or the cause of the accident resulting in Plaintiff's injuries.

Response:

Defendant Los Alamos objects to Demand No. 2 as duplicative of Demand No. 1 and incorporates all objections stated to Demand No. 1 as fully restated herein. In addition, Defendant Los Alamos objects to this request to the extent that it could be interpreted to include correspondence and proceedings previously exchanged in this litigation between counsel for the respective parties identified, all of which is already in possession of Plaintiff's counsel and of

which it would be unduly burdensome and improper to seek reproduction.

Subject to and without waiving the foregoing responses, see **Exhibit "A"** hereto.

The Defendant/Third-Party Plaintiff Los Alamos National Security, LLC reserves the right to amend and/or supplement its responses to these requests as may be appropriate.

Dated: May 4, 2012
Rochester, New York

WOODS OVIATT GILMAN LLP

By: _____

Greta K. Kolcon, Esq.
Beryl Nusbaum, Esq.
Attorneys for Defendant/Third-Party Plaintiff Los Alamos National Security LLC
700 Crossroads Building
2 State Street
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585.987.2800

TO: Louis J. Micca, Esq.
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11 State Street
Pittsford, New York 14534
585.899.6031

HOLLAND & KNIGHT, LLP
Sean C. Sheely, Esq.
Christine Tramontano, Esq.
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Attorneys for Massachusetts Institute of Technology
45 Exchange Street, Suite 800
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WARD, GREENBERG, HELLER & REIDY, LLP
Eric J. Ward, Esq.
Attorneys for University of Rochester
300 State Street, 6th Floor
Rochester, New York 14614

UNITED STATES DISTRICT COURT
WESTERN DISTRICT OF NEW YORK

SAMUEL M. ROBERTS,

Plaintiff,

v.

LOS ALAMOS NATIONAL SECURITY, LLC, AWE, PLC, and MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Civil No. 11 CV 6206L

Defendants,

v.

UNIVERSITY OF ROCHESTER,

Third-Party Defendant.

CERTIFICATE OF SERVICE

I hereby certify that on May 4, 2012, I caused to be served a true and accurate copy of the foregoing Defendant Los Alamos National Security, LLC's Supplemental Response to Plaintiff's First Demand for Discovery and Inspection, by placing a true copy thereof enclosed in a post-paid wrapper in a depository, under the exclusive custody and control of the United States Postal Service, addressed to:

Louis J. Micca, Esq.
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Pittsford, New York 14534

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Rochester, New York 14614

Greta K. Kolcon, Esq.

Woods Oviatt Gilman LLP
700 Crossroads Building
2 State Street
Rochester, New York 14614

EXHIBIT A

X-Sieve: CMU Sieve 2.2
X-CTN-5-Virus-Scanner: amavisd-new at mailrelay1.lanl.gov
X-Mailer: QUALCOMM Windows Eudora Version 6.2.1.2
Date: Wed, 09 Jul 2008 12:08:06 -0400
To: "Hans W. Herrmann" <herrmann@lanl.gov>
From: Johan Frenje <jfrenje@psfc.mit.edu>
Subject: Re: DTrat experiments on Aug 6
Cc: mmccl@lle.rochester.edu, srob@lle.rochester.edu
X-Scanned-By: MIMEDefang 2.54 on 198.125.176.238
X-Proofpoint-Virus-Version: vendor=fsecure engine=4.65.7161:2.4.4,1.2.40,4.0.164
definitions=2008-07-09_05:2008-07-09,2008-07-09,2008-07-09 signatures=0
X-Proofpoint-Spam: 0
X-CTN-5-MailScanner-Information: Please see http://network.lanl.gov/email/virus-scan.php
X-CTN-5-MailScanner: Found to be clean
X-CTN-5-MailScanner-From: jfrenje@psfc.mit.edu
X-Spam-Status: No

Hans,

Thanks for the excel file. Answers to your questions:

Yes, we will be able to detect the 3-MeV protons using CPS1 and CPS2.

I will leave for Sweden on July 20 (will be back in the middle of August). Michelle Burke at LLE will set up all the charged-particle diagnostic as always. I will provide her all the necessary input asap. Sam Roberts will help if needed, and run the PTD. As we always have a man stationed at LLE, that person will help as well (I think Dan Casey will be there that week). Although I'm in Sweden I'll stay in contact with both Michelle, Sam and perhaps Dan to make sure the charged-particle measurements are correctly implemented. I will also be involved during the shot day.

Thanks, Johan

At 04:38 PM 7/8/2008, you wrote:

> Johan,
>
> I've attached an excel file with the conditions from DTRat of Jun'07 in one worksheet (note the "AVERAGES" near the bottom) and those planned for Aug'08 along with some yield extrapolations in another worksheet. I should have calculational results by next week with predicted proton yields.
>
> In Jun'07, we simply added 3He to a fixed DT pressure of 5 atm. The highest 3He concentration case (36% 3He) will be identical between Jun'07 and Aug'08. The lower 3He concentrations for Aug'08 will be achieved by removing three D-atoms for every two 3He-atoms added (while keeping T-atoms fixed) in order to maintain hydro-equivalence.
>
> Targets are being shot with a 0.6 ns laser pulse (sg-0604) in order to provide some temporal separation between shock and compression yield components.

As we discussed on the phone, I've updated SRF 25865 to put PTD in TIM-5 and WRFMs in TIMs 3 & 4. I've also added you as a PI and granted shot data access to MIT.

Is it possible to detect the 3 MeV DD protons as well as the 15 MeV D3He protons? Can you get a rho-R measurement from either?

When do you actually leave for Sweden and who will be running the diagnostics in your place?

I'll read your papers tonight so I have a better understanding of your diagnostics.

thanks,
Hans

At 02:56 PM 7/7/2008, Johan Frenje wrote:

> Hans,
>
> Would it be possible for you to provide me the expected protons yields for your DTrat experiments on Aug 6? Could you also tell me asap what TIMs etc that I have for my disposal? I'd like to start preparing the charged-particle measurements as soon as possible as I'm going away on vacation the last week of July. It would be good if you could assign me as a co-PI to allow me implement the charged-particle measurements.
>
> Thanks, Johan
>
> ---
>
> Johan Frenje
> Plasma Science & Fusion Center
> Massachusetts Institute of Technology
> 175 Albany street, NW17-235
> Cambridge, MA, 02139, USA
> (617) 452 4941 (office, MIT)
> (585) 273 2625 (office, LLE)
> (617) 258 7929 (fax)
> http://www.psfc.mit.edu/hedp/
> jfrenje@psfc.mit.edu
> frenje@lle.rochester.edu

Hans W. Herrmann, Ph.D., CDR (Ret., USNR)
P-24 Plasma Physics, M/S E526
Los Alamos National Laboratory
Los Alamos, NM 87545
herrmann@lanl.gov
505-665-5075
fax: 667-0405

Sam Roberts, 02:32 PM 7/11/2007, Re: Fwd: June 13th, 2007 Neutronics Data

X-Sieve: CMU Sieve 2.2
Date: Wed, 11 Jul 2007 18:32:11 -0400
From: Sam Roberts <srob@lle.rochester.edu>
User-Agent: Thunderbird 1.5.0.12 (Windows/20070509)
To: "Hans W. Herrmann" <herrmann@lanl.gov>
Subject: Re: Fwd: June 13th, 2007 Neutronics Data
X-Antivirus: avast! (VPS 000755-1, 07/11/2007), Outbound message
X-Antivirus-Status: Clean
X-PMX-Version: 5.3.2.304607, Antispam-Engine: 2.5.1.298604, Antispam-Data: 2007.7.11.151035
X-PerlMx-Spam: Gauge=IIIIIII, Probability=7%, Report='__BAT_BOUNDARY 0, __CT 0, __CTYPE_HAS_BOUNDARY 0, __CTYPE_MULTIPART 0, __HAS_MSGID 0, __MIME_VERSION 0, __SANE_MSGID 0, __USER_AGENT 0'
X-LLE-MailScanner: Found to be clean
X-Proofpoint-Virus-Version: vendor=fsecure engine=4.65.5502:2.3.11,1.2.37,4.0.164 definitions=2007-07-11_06:2007-07-11,2007-07-11,2007-07-11 signatures=0
X-Proofpoint-Spam: 0

Hans,
Here's corrected data for shot 47880. The P510, again, had a large noise spike which masqueraded as the 1st fiducial peak. I removed that, which seems to have corrected the problem. Still working on 47875.
Sam

47880_ntd.ps

-500.00000	1.00000e-06	0.000227706
-494.00000	1.00000e-06	0.000213548
-488.00000	1.00000e-06	0.000197471
-482.00000	1.00000e-06	0.000176036
-476.00000	1.00000e-06	0.000148583
-470.00000	1.00000e-06	0.000106598
-464.00000	1.00000e-06	7.47561e-05
-458.00000	1.00000e-06	6.42857e-05
-452.00000	1.00000e-06	6.34128e-05
-446.00000	1.00000e-06	8.02926e-05
-440.00000	1.00000e-06	9.69873e-05
-434.00000	1.00000e-06	0.000113380
-428.00000	1.00000e-06	0.000128278
-422.00000	1.00000e-06	0.000141016
-416.00000	1.00000e-06	0.000144939
-410.00000	1.00000e-06	0.000137556
-404.00000	1.00000e-06	0.000136225
-398.00000	1.00000e-06	0.000141798
-392.00000	1.00000e-06	0.000170991
-386.00000	1.00000e-06	0.000224168
-380.00000	1.00000e-06	0.000258403
-374.00000	1.00000e-06	0.000275521
-368.00000	1.00000e-06	0.000291569
-362.00000	1.00000e-06	0.000306756

Sam Roberts, 12:43 PM 7/6/2007, Re: Fwd: June 13th, 2007 Neutronics Data

Attached are the scintillator and NTD files along with the summary file.

Mike Cruz

Hans W. Herrmann, Ph.D., CDR (Ret., USNR)
P-24 Plasma Physics, MS E526
Los Alamos National Laboratory
Los Alamos, NM 87545
herrmann@lanl.gov
505-665-5075
fax: 665-4409

if Foreign correspondence: TSPA or Correspondence

shots_06112007_12mh vs cu.xls

Sam Roberts, 09:32 AM 6/28/2007, Re: Fwd: June 13th, 2007 Neutronics Data

To: Sam Roberts <srob@lle.rochester.edu>
From: "Hans W. Herrmann" <herrmann@lanl.gov>
Subject: Re: Fwd: June 13th, 2007 Neutronics Data
Cc:
Bcc:
Attached:

Sam,

Sorry to keep bothering you, but I a few more questions about NTD:

For most of my DT shots (47872-47882) the "t(laser@2%) - t(fidu)" value printed on the last page of the NTD pdf file is around 900 ps, however, for shot 47875 it is 1258 ps. If I use this value for 47875, the gamma bang time is inconsistent with the rest of the shots, whereas a value of 900 ps brings it into line with the rest of my data. How do I go about digging deeper into determining what is the correct value to use?

Also, for two shots (47877 & 47881) the p510 cluster 3 fidu was used as a timing reference instead of cluster 4, although the cluster 4 fidu looks reasonable to me. Is it possible to recalculate NTD bang time based on cluster 4, or otherwise determine the effect of using cluster 3?

Any thoughts on the ACTR vs NTD issue below?

thanks,
Hans

At 03:02 PM 6/26/2007, Hans W. Herrmann wrote:
Sam,

The 12mntofh neutron yields I got from Mike Cruz run about 18% higher than the Cu ACTR yields I got from Zaheer Ali, and there is considerable scatter when one is plotted against the other (see attachment). Do you recommend using one yield diagnostic over the other, or perhaps a weighted average?

thanks,
Hans

Date: Wed, 13 Jun 2007 19:40:54 -0400
From: Mike Cruz <mcru@lle.rochester.edu>
User-Agent: Thunderbird 1.5.0.12 (Windows/20070509)
To: herrmann@lanl.gov
Subject: June 13th, 2007 Neutronics Data

Attached are the scintillator and NTD files along with the summary file.

Mike Cruz

Hans W. Herrmann, Ph.D., CDR (Ret., USNR)
P-24 Plasma Physics, MS E526
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if Foreign correspondence: TSPA or Correspondence

Sam Roberts, 12:43 PM 7/6/2007, Re: Fwd: June 13th, 2007 Neutronics Data

X-Sieve: CMU Sieve 2.2
Date: Fri, 06 Jul 2007 16:43:25 -0400
From: Sam Roberts <srob@lle.rochester.edu>
User-Agent: Thunderbird 1.5.0.12 (Windows/20070509)
To: "Hans W. Herrmann" <herrmann@lanl.gov>
Subject: Re: Fwd: June 13th, 2007 Neutronics Data
X-Antivirus: avast! (VPS 000754-4, 07/06/2007), Outbound message
X-Antivirus-Status: Clean
X-PMX-Version: 5.3.2.304607, Antispam-Engine: 2.5.1.298604, Antispam-Data: 2007.7.6.132933
X-PerlMx-Spam: Gauge=IIIIIII, Probability=7%, Report='__BAT_BOUNDARY 0, __C230066_P5 0, __CT 0, __CTYPE_HAS_BOUNDARY 0, __CTYPE_MULTIPART 0, __HAS_MSGID 0, __MIME_VERSION 0, __SANE_MSGID 0, __USER_AGENT 0'
X-LLE-MailScanner: Found to be clean
X-Proofpoint-Virus-Version: vendor=fsecure engine=4.65.5502:2.3.11,1.2.37,4.0.164 definitions=2007-07-06_05:2007-07-05,2007-07-06,2007-07-06 signatures=0
X-Proofpoint-Spam: 0

Hans,
I would use the 12mntofh yields.

Here's why:
I compared the yields of both the 12mntofh and the Cu activation to another detector (the PD040), which was run on the same shots.
This detector is not calibrated, so I only used the integral of its signal for the comparison.
If you take (Yield / PD040 Signal sum) you get a calibration for the PD040 relative to whatever detector you're comparing it to.
Attached is the resulting graph for the 12mntofh and the Cu activation diagnostics. Both should nominally be a flat line (if both detectors are consistent). As you can see the activation diagnostic appears to have been behaving erratically that day. I'm still not sure why, but the 12mntofh seems to be the better bet.

Sam

Hans W. Herrmann wrote:
Sam,

The 12mntofh neutron yields I got from Mike Cruz run about 18% higher than the Cu ACTR yields I got from Zaheer Ali, and there is considerable scatter when one is plotted against the other (see attachment). Do you recommend using one yield diagnostic over the other, or perhaps a weighted average?

thanks,
Hans

Date: Wed, 13 Jun 2007 19:40:54 -0400
From: Mike Cruz <mcru@lle.rochester.edu>
User-Agent: Thunderbird 1.5.0.12 (Windows/20070509)
To: herrmann@lanl.gov
Subject: June 13th, 2007 Neutronics Data

if Foreign correspondence: TSPA or Correspondence

[X] Unrestricted (P-DIV-POL-020, Att. 1, Rev. 0, 28 March 2006)
[ ] - Non-Technical Correspondence
[X] - Technical Correspondence
LA-UR [ ] - LA-CP [ ] - LALP [ ]
Reviewed [ ] ADC -
DUSA ADTO [ ]
DUSA HEP [ ]

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4558.0000	1.00000e-06	0.00707792
4564.0000	1.00000e-06	0.00710819
4570.0000	1.00000e-06	0.00713845
4576.0000	1.00000e-06	0.00716871
4582.0000	1.00000e-06	0.00719898
4588.0000	1.00000e-06	0.00722924
4594.0000	1.00000e-06	0.00725950
4600.0000	1.00000e-06	0.00728976
4606.0000	1.00000e-06	0.00732003
4612.0000	1.00000e-06	0.00735029
4618.0000	1.00000e-06	0.00738055
4624.0000	1.00000e-06	0.00741082
4630.0000	1.00000e-06	0.00744108
4636.0000	1.00000e-06	0.00747134
4642.0000	1.00000e-06	0.00750160
4648.0000	1.00000e-06	0.00753187
4654.0000	1.00000e-06	0.00756213
4660.0000	1.00000e-06	0.00759239
4666.0000	1.00000e-06	0.00762266
4672.0000	1.00000e-06	0.00765292
4678.0000	1.00000e-06	0.00768318
4684.0000	1.00000e-06	0.00771344
4690.0000	1.00000e-06	0.00774371
4696.0000	1.00000e-06	0.00777397
4702.0000	1.00000e-06	0.00780423
4708.0000	1.00000e-06	0.00783450
4714.0000	1.00000e-06	0.00786476
4720.0000	1.00000e-06	0.00789502
4726.0000	1.00000e-06	0.00792528
4732.0000	1.00000e-06	0.00795555
4738.0000	1.00000e-06	0.00798581
4744.0000	1.00000e-06	0.00801607
4750.0000	1.00000e-06	0.00804634
4756.0000	1.00000e-06	0.00807660
4762.0000	1.00000e-06	0.00810686
4768.0000	1.00000e-06	0.00813712
4774.0000	1.00000e-06	0.00816739
4780.0000	1.00000e-06	0.00819765
4786.0000	1.00000e-06	0.00822791
4792.0000	1.00000e-06	0.00825818
4798.0000	1.00000e-06	0.00828844
4804.0000	1.00000e-06	0.00831870
4810.0000	1.00000e-06	0.00834896
4816.0000	1.00000e-06	0.00837923
4822.0000	1.00000e-06	0.00840949
4828.0000	1.00000e-06	0.00843975
4834.0000	1.00000e-06	0.00847002
4840.0000	1.00000e-06	0.00850028

4846.0000	1.00000e-06	0.00853054
4852.0000	1.00000e-06	0.00856080
4858.0000	1.00000e-06	0.00859107
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4870.0000	1.00000e-06	0.00865159
4876.0000	1.00000e-06	0.00868186
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4888.0000	1.00000e-06	0.00874238
4894.0000	1.00000e-06	0.00877264
4900.0000	1.00000e-06	0.00880291
4906.0000	1.00000e-06	0.00883317
4912.0000	1.00000e-06	0.00886343
4918.0000	1.00000e-06	0.00889370
4924.0000	1.00000e-06	0.00892396
4930.0000	1.00000e-06	0.00895422
4936.0000	1.00000e-06	0.00898448
4942.0000	1.00000e-06	0.00901475
4948.0000	1.00000e-06	0.00904501
4954.0000	1.00000e-06	0.00907527
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5026.0000	1.00000e-06	0.00943843
5032.0000	1.00000e-06	0.00946869
5038.0000	1.00000e-06	0.00949895
5044.0000	1.00000e-06	0.00952922
5050.0000	1.00000e-06	0.00955948
5056.0000	1.00000e-06	0.00958974
5062.0000	1.00000e-06	0.00962001
5068.0000	1.00000e-06	0.00965027
5074.0000	1.00000e-06	0.00968053
5080.0000	1.00000e-06	0.00971079
5086.0000	1.00000e-06	0.00974106
5092.0000	1.00000e-06	0.00977132
5098.0000	1.00000e-06	0.00980158
5104.0000	1.00000e-06	0.00983184
5110.0000	1.00000e-06	0.00986211
5116.0000	1.00000e-06	0.00989237
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5128.0000	1.00000e-06	0.00995290
5134.0000	1.00000e-06	0.00998316
5140.0000	1.00000e-06	0.0100134
5146.0000	1.00000e-06	0.0100437

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5158.0000	1.00000e-06	0.0101042
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5182.0000	1.00000e-06	0.0102253
5188.0000	1.00000e-06	0.0102555
5194.0000	1.00000e-06	0.0102858
5200.0000	1.00000e-06	0.0103161
5206.0000	1.00000e-06	0.0103463
5212.0000	1.00000e-06	0.0103766
5218.0000	1.00000e-06	0.0104068
5224.0000	1.00000e-06	0.0104371
5230.0000	1.00000e-06	0.0104674
5236.0000	1.00000e-06	0.0104976
5242.0000	1.00000e-06	0.0105279
5248.0000	1.00000e-06	0.0105582
5254.0000	1.00000e-06	0.0105884
5260.0000	1.00000e-06	0.0106187
5266.0000	1.00000e-06	0.0106489
5272.0000	1.00000e-06	0.0106792
5278.0000	1.00000e-06	0.0107095
5284.0000	1.00000e-06	0.0107397
5290.0000	1.00000e-06	0.0107700
5296.0000	1.00000e-06	0.0108003
5302.0000	1.00000e-06	0.0108305
5308.0000	1.00000e-06	0.0108608
5314.0000	1.00000e-06	0.0108910
5320.0000	1.00000e-06	0.0109213
5326.0000	1.00000e-06	0.0109516
5332.0000	1.00000e-06	0.0109818
5338.0000	1.00000e-06	0.0110121
5344.0000	1.00000e-06	0.0110424
5350.0000	1.00000e-06	0.0110726
5356.0000	1.00000e-06	0.0111029
5362.0000	1.00000e-06	0.0111331
5368.0000	1.00000e-06	0.0111634
5374.0000	1.00000e-06	0.0111937
5380.0000	1.00000e-06	0.0112239
5386.0000	1.00000e-06	0.0112542
5392.0000	1.00000e-06	0.0112845
5398.0000	1.00000e-06	0.0113147
5404.0000	1.00000e-06	0.0113450
5410.0000	1.00000e-06	0.0113753
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5422.0000	1.00000e-06	0.0114358
5428.0000	1.00000e-06	0.0114660
5434.0000	1.00000e-06	0.0114963
5440.0000	1.00000e-06	0.0115266
5446.0000	1.00000e-06	0.0115568
5452.0000	1.00000e-06	0.0115871

5458.0000	1.00000e-06	0.0116174
5464.0000	1.00000e-06	0.0116476
5470.0000	1.00000e-06	0.0116779
5476.0000	1.00000e-06	0.0117081
5482.0000	1.00000e-06	0.0117384
5488.0000	1.00000e-06	0.0117687
5494.0000	1.00000e-06	0.0117989

Sam Roberts, 01:32 PM 1/3/2007, Re: NTD Data

To: Sam Roberts <srob@lle.rochester.edu>
From: "Hans W. Herrmann" <herrmann@lanl.gov>
Subject: Re: NTD Data
Cc:
Bcc:
Attached:

Thanks Sam,
Hans

At 02:08 PM 1/3/2007, you wrote:
Hans,
Sorry about the delay regarding this data, I forgot all about it. Unfortunately there is no data for shots 45046-45049. This is because they were above the useful yield range of NTD, and NTD was powered down to prevent damage. There is a new HYNTD (high yield NTD) under development, but it doesn't look like it gave any results for said shots.
We have done a calibration for NTD, however, since NTD had to be removed and repaired (again) after your shots it is not relevant to your shots. The good news is that even after both repairs the calibration remained within our tolerances. This bodes well for the absolute timing of your shots, but doesn't prove anything. For shot to shot comparison the timing is still accurate.
For shot 45039 (which used cluster 1) you can use a correction factor if you like. I reanalyzed all your shots with clust 1 and there is a systematic offset of ~37 ps between clust 1 & 4. If you correct the bang it would be 1352 (instead of 1315).
I wasn't sure why there was a ~170 ps spread in the t(laser@2%)-t(fidu), I asked drivers about that though. They said it was because the timing of the pulse was adjusted after the first shot. They try to keep the start of the pulse and the start of the fiducial train within ~100ps of each other. They calculate the timing for the first shot, so that one often is farther off than the rest of the day. However, this wouldn't affect our bang times though, since our reference is unchanged.

Sam
P.S. Have a Happy New Year!

Hans W. Herrmann wrote:
Sam,
Any chance I can get the NTD data for shots 45046-45049 (sorry about the typo in my last email)? I'd sure appreciate it!
thanks,
Hans

At 01:59 PM 10/20/2006, Hans W. Herrmann wrote:
Sam,

Thank you for the NTD data. I'm finally getting a chance to go through it in detail.

I would appreciate it if you could send the pdf & txt files for shots 25046-25049 as well. These were the high yield shots for Neutron Imaging.

I understand the absolute timing calibration was comprised by the streak camera repair. Do you have a feeling for how much the calibration may be off by? Will it be possible to go back and apply a

correction factor to these data once a new calibration is performed?

I assume the relative shot-to-shot timing is accurate, perhaps with the exception of shot 45039. There was a burble in p510 cluster 4 on this shot, so I believe you used cluster 1 as your timing reference instead. How do I go about accounting for this reference change, or do I even need to?

I notice there's ~170 ps spread in the t(laser@2%)-t(fidu) on these 7 shots. That's considerably larger than what I've seen before. What accounts for this?

thanks,
Hans

At 09:38 AM 10/5/2006, Sam Roberts wrote:
Hans,
Here's your NTD data from your shots yesterday.
Sam

University of Rochester
Laboratory for Laser Energetics

Caveats:
* Current Error Bars: NTD= +/- ??? ps
** Please review all data with Christian Stoeckl and/or Vladimir Glebov prior to publication

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Sam Roberts, 01:32 PM 1/3/2007, Re: NTD Data

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